Transactions of The New York Academy of Sciences

SERIES II
VOLUME 11

NEW YORK
PUBLISHED BY THE ACADEMY
1948—1949

Q
11
.N524

Editor
ROY WALDO MINER

Associate Editor
PAUL LENIHAN

DW

Exchs.
N. Y. Acad. Sci

CONTENTS OF SERIES II, VOLUME 11

	PAGE
Title page	i
Contents	iii
Historical Introduction with Some General Comments Concerning the Relation between Chemical Structure and Relaxant Activity. *By* W. A. LOTT	2
Clinical Applications of Myanesin. *By* EDWARD B. SCHLESINGER	5
Anthropology in Micronesia. *By* GEORGE PETER MURDOCK	9
Conference held: "Aureomycin—A New Antibiotic"	16
New Members	18, 57, 149, 183, 232, 261
The Geologic History of Paricutin. *By* FREDERICK H. POUGH	28
Problems in the Behavior and Physiology of a Species of African Mouth-Breeding Fish. *By* LESTER R. ARONSON	33
The Psychological Principles in the Diagnostic and Therapeutic Applications of Hypnosis. *By* ROBERT D. WEITZ	43
Theory of Hypertension in Man. *By* EDMUND JACOBSON	49
Isomerization in Macromolecules. *By* HERMAN MARK	51
Conference held: "Methodology and Techniques for the Study of Animal Societies"	56
The Origin of Red Beds. *By* PAUL D. KRYNINE	60
The Barium Metabolism of Hornets Studied by Means of Radioisotopes. *By* VAUGHAN T. BOWEN	68
Information Obtained from the Interaction of Slow Neutrons with Matter. *By* JAMES RAINWATER	72
Conference held: "The Ground Substance of the Mesenchyme and Hyaluronidase"	80
Report of the Annual Meeting. *By* EUNICE THOMAS MINER	82
Recording Sounds of Undersea Life. *By* MILTON B. DOBRIN	91
Abstracts of Prize-Winning Papers:	
Effect of Concentration on the Viscosity of Dilute Solutions. *By* ROBERT SIMHA	96
The Relation of the Adrenal Cortex to the Structure and Phagocytic Activity of the Macrophagic System. *By* ALBERT S. GORDON AND GRACE F. KATSH	96
Porto Rican Prehistory. *By* IRVING ROUSE	97
Drainage Evolution in the Appalachians of Pennsylvania. *By* HENRY D. THOMPSON	97
The Electron Microscope Applied to Geological Research. *By* THOMAS F. BATES	100
A.T.P.-ase Activity in Embryonic Development. *By* L. G. BARTH	108
A New Method for the Evaluation of Antifungal Chemicals. *By* SAMUEL M. PECK	112
The Annual Science Talent Search for the Westinghouse Scholarships. *By* H. A. EDGERTON AND S. H. BRITT	118
Some Preliminary Considerations of Larger Units in Chinese Social Organization. *By* MORTON H. FRIED	121
The Negro Kingdoms of the Sudan. *By* JOSEPH GREENBERG	126
Application of Reaction Rate Principles to Some Mechanical Properties of Materials. *By* EDWARD SAIBEL	135
A. Cressy Morrison Prize Contest for 1949	147
Conference held: "The Place of Statistical Methods in Biological and Chemical Experimentation"	148
Garnet Evidence in Adirondack Petrogeny. *By* S. BENEDICT LEVIN	156
Nuclear Cytology of Fungi. *By* EDWARD DELAMATER	162
Psychological Principles of the Visual Motor Gestalt Test. *By* LAURETTA BENDER	164

PAGE

The Tree of Culture. *By* RALPH LINTON 171

A Dissipation Mechanism in Gas Flows and Similar Physical Systems. *By* PAUL LIEBER 175

Conference held: "Development and Uses of Antimetabolites" 182

The Blister Hypothesis and the Orogenic Cycle. *By* C. W. WOLFE 188

The Treatment of Human Thyroid Disease with Radioactive Iodine. *By* J. B. TRUNNELL 195

Degenerative and Regenerative Changes in the Thyroid Gland Following High Dosages of Radioactive Iodine. *By* AUBREY GORBMAN 201

The Zone of Activity of Antibodies as Determined by the Use of Radioactive Tracers. *By* DAVID PRESSMAN 203

The Anti-Borrelia Effect of Borrelidin. *By* M. BUCK, A. C. FARR, AND R. J. SCHNITZER 207

Enhancement of Penicillin Activity by Borrelidin. *By* E. GRUNBERG, D. ELDRIDGE, G. SOO-HOO, AND D. R. KELLY 210

The Q-Technique Study of Personality. *By* WILLIAM STEPHENSON 215

Concept of Land Tenure in World Culture. *By* JOHN M. COOPER 220

Precision Colorimetry. *By* CLARENCE F. HISKEY 223

Conferences held: "Coccidiosis," "Specific Methods of Analysis" 229

An Approximate Solution of Certain Diffusion Problems. *By* HOWARD REISS 236

The Response of the Mouse Adrenal Gland to Steroid Hormones: Report on Recent Investigation. *By* JAMES H. LEATHEM 239

Psychomotor Function as Correlated with Body Mechanics and Posture. *By* LULU E. SWEIGARD 243

Histoplasmosis in Animals. *By* C. W. EMMONS 248

Evidence for Pleistocene Man at La Jolla, California *By* GEORGE F. CARTER 254

Conference held: "International Conference on Vitamin E" 257

Experimental Studies of Adsorption on Aqueous Solutions. *By* ERIC HUTCHINSON 266

The Biological Significance of the Tissue Dose of Ionizing Radiations. *By* HARALD H. ROSSI 270

The Nature of Space and Visualization Abilities: Some Recent Findings Based on Factor-Analysis Studies. *By* WILLIAM B. MICHAEL 275

Influence of Nutrition on Growth and Morphology of the Dermatophytes. *By* LUCILLE GEORG 281

Q
11
N529

SER. II, VOL. 11 *November, 1948* No. 1

TRANSACTIONS
OF
THE NEW YORK ACADEMY OF SCIENCES

Editor
ROY WALDO MINER

Associate Editor
PAUL LENIHAN

Contents

Historical Introduction, with Some General Comments Concerning the Relation between Chemical Structure and Relaxant Activity. *By* W. A. LOTT 2

Clinical Applications of Myanesin. *By* EDWARD B. SCHLESINGER 5

Anthropology in Micronesia. *By* GEORGE PETER MURDOCK 9

Conference Held: "Aureomycin—A New Antibiotic" 16

New Members 18

Copyright, 1948, by The New York Academy of Sciences

TRANSACTIONS of The New York Academy of Sciences, Series II, Volume 11, No. 1, November, 1948.
Entered as second-class matter December 12, 1947, at the post office at New York, N. Y., under the act of August 24, 1912. Application for entry at Baltimore, Md., pending. This publication is distributed to members and is published monthly from November to June, inclusive, by The New York Academy of Sciences, Mt. Royal and Guilford Aves., Baltimore 2, Md. Editorial office: Seventy-Ninth Street and Central Park West, New York 24, N. Y.
Permission for re-entry as second-class matter pending at the post office at Baltimore, Md., under the act of August 24, 1912.

Executive Director: EUNICE THOMAS MINER

*SECTION OF BIOLOGY**

October 11, 1948

SYMPOSIUM: SKELETAL MUSCLE RELAXANTS†

HISTORICAL INTRODUCTION, WITH SOME GENERAL COMMENTS CONCERNING THE RELATION BETWEEN CHEMICAL STRUCTURE AND RELAXANT ACTIVITY

By W. A. LOTT‡

In 1914, Starkenstein first demonstrated that ineffective doses of curare in combination with ineffective doses of ether produced deep narcosis; and he and Meltzer and others used magnesium sulfate intravenously as an antispastic agent. Straub, in 1915, used magnesium sulfate in the symptomatic treatment of tetanus in war casualties. Latterly, it was tried from time to time as an intravenous anesthetic; but its important disadvantages have prevailed over its advantages.

In 1889, a German patent issued to the firm of Bayer in Elberfeld claimed that formylphenetidine had no analgesic or antipyretic action, but did have an extraordinary paralyzant action upon the spinal cord. This paralyzant action was claimed to be sufficient in kind and magnitude to be antidotal in strychnine convulsions, and useful in the treatment of spastic disease. This has not been substantiated.

In 1910, an interestingly simple compound, phenoxypropanediol, was introduced into medicine under the name Antodyne by Poulenc-Frères. It was recommended as an orally administrable analgesic and antipyretic for use in headaches, rheumatic pains, etc. Furthermore, Launoy in the same year observed its ability to produce flaccid paralysis of the muscles when injected into animals. These animals were then no longer sensitive to lethal doses of strychnine.

In January, 1947, a publication by Berger and Bradley confirmed and expanded the earlier reports concerning compounds of the Antodyne type.[1] They reported that the compound *o*-toloxypropanediol had a curare-like ability to inhibit convulsions produced by strychnine, as well as relax the musculature to a degree which recommended its use in surgical anesthesia and in spastic disease. It was introduced into clinical use in England under the name Myanesin, and now it is being distributed in this country under the name Tolserol.

Following the report of Berger and Bradley, a comprehensive study of this chemical type was undertaken at the Squibb Institute and 115 compounds synthesized by Messrs. Braker, Pribyl and Drs. Yale and Bergeim were compared with Antodyne by Dr. Richardson and associates in a convenient intraperitoneal mouse paralysis test, using loss of righting reflex as the criterion of paralysis. This simple screening test did not involve the question of mechanism of action.[2]

* The Section of Geology and Mineralogy held a meeting on October 4, 1948, at which Doctor C. F. Stewart Sharpe, Falls Church, Va., presented a paper entitled *Mass Movement in Relation to Geomorphology, Agriculture, and Engineering.* This has not been received for publication.

† Doctor Arthur P. Richardson, Emory University School of Medicine, Emory University, Georgia, presented a paper entitled *Studies on Pharmacology of 3-ortho-tolexy-1, 2-propanediol (Tolserol) and Related Compounds*, at this Symposium. It has not been received for publication.

‡ Division of Medicinal Chemistry, Squibb Institute for Medical Research, New Brunswick, N. J.

[1] Muscle-relaxing action of Myanesin. Lancet **252**: 97. 1947.

[2] Recently, BERGER has reported a similar comprehensive study which largely parallels our own. See, The relationship between chemical structure and central depressant action of α-substituted ethers of glycerol. J. Pharmacol. **93**: 470. 1948.

exch
NY Academy of Sciences
2-10-49

The data in TABLE I show three columns of numbers which are: (1) the ratio of the potency (PD_{50}) of Antodyne to the potency (PD_{50}) of the drug on test; (2) the ratio of the toxicity (LD_{50}) of Antodyne to the toxicity (LD_{50}) of the drug on test; and (3) the ratio of the therapeutic index of the drug on test to the therapeutic index of Antodyne.

It is quite evident that, in synthesizing improved relaxants which are designed to affect the brain stem and spinal cord at subhypnotic dose, we are not yet in a position to predesign according to specifications. What we apparently need to do is to get compounds with longer duration of effect. For parenteral use, we shall need to improve solubility; or, ease of solubilization. For oral use, we shall need to strive for reliable absorption and freedom from emetic properties.

We have acquired some considerable background of reference for such advances and can correlate much of it with rather fundamental facts. Thus, we know that the aromatic hydrocarbon benzene is unlike the aliphatic hydrocarbons, in that it does not initially depress the sensory nerves. It predominantly affects the motor centers of the mid-brain and the spinal cord. In not too overwhelming dose, it first stimulates these and causes spasms, tremors, and elevated reflex excitability; in other words, it acts convulsant. In larger doses or after a longer time, this passes over into paralysis. This effect is not due to general sedation as with the aliphatic hydrocarbons, but to overstimulation and fatigue of the motor nerves, which is not rapidly reversible. These effects gradually move outward peripherally.

Benzene is almost completely oxidized to phenol in the body and it is possible that its action is attributable to this phenol, prior to its conjugation to sulfuric esters and glucuronates. Toluene which is oxidized to benzoic and *p*-hydroxy benzoic acid, and ethyl benzene which is oxidized to methylphenylcarbinol act more like the aliphatic hydrocarbons.

Insertion of a hydroxy group into the ring greatly enhances this convulsant activity and phenol is a much stronger convulsant than benzene itself. In laboratory animals and sometimes in children, it produces spasms and elevated reflex excitability followed by paralysis and finally collapse. In human adults, the convulsant stage is so rapidly passed over into the paralysis stage that spasms are seldom observed. Phenol also acts upon the peripheral nerve endings. Larger doses paralyze the motor nerves whilst small doses have a definite local anesthetic action. The temperature-lowering effect inherent in aromatic compounds is well developed in phenol.

If the hydroxyl group is methylated to form the simple ether anisole, the action is diminished. Anisole does produce clonic spasms, tremors, tonic spasms and, finally, paralysis of central origin.

As has been well demonstrated, the benzene ring can partake of the nature of a higher aliphatic radical when linked with an aliphatic residue or with certain functional groups. Thus, it lends typical aliphatic narcotic properties to such compounds as benzyl alcohol, saligenin, acetophenone, benzamide, and phenobarbital.

So far as the glyceryl side-chain is concerned, there is little to say. Glycerine itself in any reasonable dose is quite inert. Triacetin is mildly sedative and so, also, is the diethyl ether. Certainly, this slight activity derives from the alkylation. Among the glycols, alkylation of the carbon chain produces hypnotic activity.

A number of key compounds are now being studied to determine whether the

TABLE I

No.	Structure	Phenoxypropanediol equivalents: Potency	Toxicity	Therapeutic Index
1.	Phenyl-$OCH_2CHOHCH_2OH$	1.0	1.0	1.0
2.	Phenyl-OCH_2CH_2OH	1.4	1.6	0.9
3.	*o*-Tolyl-OCH_2CH_2OH	2.7	2.6	1.0
4.	*m*-Tolyl-OCH_2CH_2OH	2.5	2.4	1.0
5.	*p*-Tolyl-OCH_2CH_2OH	2.3	2.3	1.0
6.	*o*-Tolyl-$OCH_2CHOHCH_3$	2.9	2.3	1.3
7.	*m*-Tolyl-$OCH_2CHOHCH_3$	1.5	2.0	0.8
8.	*p*-Tolyl-$OCH_2CHOHCH_3$	1.9	2.3	0.8
9.	*o*-Tolyl-$OCH_2C(CH_3)(OH)C_2H_5$	3.5	2.4	1.5
10.	*o*-CH_3-phenyl-$OCH_2CHOHCH_2OH$	2.2	2.2	1.0
11.	*m*-CH_3-phenyl-$OCH_2CHOHCH_2OH$	2.4	2.1	1.1
12.	*p*-CH_3-phenyl-$OCH_2CHOHCH_2OH$	1.2	2.1	0.6
13.	*o*-$CH_2{=}CHCH_2$-phenyl-$OCH_2CHOHCH_2OH$	2.6	3.0	0.9
14.	*o*-$CH_3CH{=}CH$-phenyl-$OCH_2CHOHCH_2OH$	3.1	3.8	0.8
15.	*o*-$CH_3CH_2CH_2$-phenyl-$OCH_2CHOHCH_2OH$	3.8	4.1	0.9
16.	*m*-CH_3CH_2-phenyl-$OCH_2CHOHCH_2OH$	2.0	2.2	0.9
17.	*o*-$(CH_3)_2CH$-phenyl-$OCH_2CHOHCH_2OH$	2.2	2.0	1.1
18.	*o*-Cyclohexylphenyl-$OCH_2CHOHCH_2OH$	1.4	2.2	0.6
19.	*o*-Tert.-amylphenyl-$OCH_2CHOHCH_2OH$	2.2	2.6	0.8
20.	*o*-α-Methylisobutylphenyl-$OCH_2CHOHCH_2OH$	2.1	3.9	0.5
21.	*p*-Tert.-butylphenyl-$OCH_2CHOHCH_2OH$	1.6	1.8	0.9
22.	*o*-C_6H_5-phenyl-$OCH_2CHOHCH_2OH$	3.9	3.4	1.1
23.	*o*-CH_3O-phenyl-$OCH_2CHOHCH_2OH$*	1.1	0.9	1.2
24.	*m*-CH_3O-phenyl-$OCH_2CHOHCH_2OH$	1.0	0.9	1.1
25.	*p*-CH_3O-phenyl-$OCH_2CHOHCH_2OH$	0.6	0.6	1.0
26.	*p*-CH_3CH_2O-phenyl-$OCH_2CHOHCH_2OH$	1.0	1.1	0.9
27.	*o*-Cl-phenyl-$OCH_2CHOHCH_2OH$	1.7	1.7	1.0
28.	*m*-Cl-phenyl-$OCH_2CHOHCH_2OH$	2.1	2.3	0.9
29.	*p*-Cl-phenyl-$OCH_2CHOHCH_2OH$	2.1	1.8	1.2
30.	*p*-NH_2-phenyl-$OCH_2CHOHCH_2OH$	0.2	0.4	0.5
31.	*o*-CH_3CONH-phenyl-$OCH_2CHOHCH_2OH$	0.2	0.4	0.5
32.	*p*-CH_3CONH-phenyl-$OCH_2CHOHCH_2OH$	0.1	0.2	0.5
33.	*o*-CH_3CH_2OOCNH-phenyl-$OCH_2CHOHCH_2OH$	1.2	1.6	0.8
34.	*p*-CH_3CH_2OOCNH-phenyl-$OCH_2CHOHCH_2OH$	0.9	1.4	0.6
35.	*o*-$HOCH_2$-phenyl-$OCH_2CHOHCH_2OH$	0.4	0.5	0.8
36.	*o*-$CH_2OHCHOHCH_2O$-phenyl-$OCH_2CHOHCH_2OH$	0.4	0.8	0.5
37.	2,4-Di-sec.-butylphenyl-$OCH_2CHOHCH_2OH$	1.3	3.2	0.4
38.	2,6-Dimethoxyphenyl-$OCH_2CHOHCH_2OH$	1.1	1.1	1.0
39.	3-Methyl-4-chlorophenyl-$OCH_2CHOHCH_2OH$	2.4	2.2	1.1
40.	2,4-Dichlorophenyl-$OCH_2CHOHCH_2OH$	2.1	2.3	0.9
41.	3,5-Dimethylphenyl-$OCH_2CHOHCH_2OH$	2.3	2.8	0.8
42.	2,5-Dimethylphenyl-$OCH_2CHOHCH_2OH$	2.1	2.5	0.8
43.	3,4-Dimethylphenyl-$OCH_2CHOHCH_2OH$	2.3	2.4	1.0
44.	2,6-Dimethylphenyl-$OCH_2CHOHCH_2OH$	3.4	2.8	1.2
45.	2-Isopropyl-5-methylphenyl-$OCH_2CHOHCH_2OH$	2.9	2.5	1.2
46.	2-Allyl-6-methylphenyl-$OCH_2CHOHCH_2OH$	3.6	3.1	1.2
47.	2,4-Di-tert.-butylphenyl-$OCH_2CHOHCH_2OH$	0.4	1.2	0.3
48.	$CH_3CH_2CH_2CH_2OCH_2CHOHCH_2OH$	0.5	0.5	1.0
49.	$CH_3CH_2CH_2CH(CH_3)CH(C_2H_5)CH_2OCH_2CHOHCH_2OH$	0.8	1.5	0.5
50.	*o*-CH_2-cyclohexyl-$OCH_2CHOHCH_2OH$	1.0	1.3	0.8
51.	Phenyl-$CH_2OCH_2CHOHCH_2OH$	0.9	1.1	0.8
52.	Phenyl-$CH(CH_3)OCH_2CHOHCH_2OH$	1.2	1.4	0.9
53.	Phenyl-$CH{=}CHCH_2OCH_2CHOHCH_2OH$	1.0	0.8	1.3
54.	2,4-Dimethyl-6-pyrimidyl-$OCH_2CHOHCH_2OH$	0.03	0.2	0.2
55.	*o*-Tolyl-$SCH_2CHOHCH_2OH$	1.3	2.8	0.5
56.	*o*-Tolyl-$SCH_2C(CH_3)(OH)CH_2OH$	2.5	2.9	0.9
57.	*o*-Tolyl-$SO_2CH_2C(CH_3)(OH)CH_2OH$	0.4	0.8	0.5
58.	*o*-Tolyl-$NHCH_2CHOHCH_2OH$	0.3	0.6	0.5
59.	*o*-Tolyl-$NHCOOCH_2CHOHCH_2OH$	0.4	0.8	0.5
60.	*o*-Tolyl-$N(COCH_3)CH_2CHOHCH_2OH$	0.4	0.8	0.5
61.	*o*-Tolyl-$N(COOC_2H_5)CH_2CHOHCH_2OH$	1.0	1.2	0.8

* This compound is Resyl, which has been on the market for years as an expectorant and recently has been studied by SMITH of Toronto for its emetic and anesthetic action. See, A comparison of racemic and levo glycero-guaiacol ethers for anesthetic and other actions. J. Pharmacol. **91**: 93. 1947.

TABLE 1—*Concluded*

No.	Structure	*Phenoxypropanediol equivalents* Potency	Toxicity	Therapeutic Index
62.	*o*-Tolyl-$OCH_2C(CH_3)(OH)CH_2OH$	3.9	2.9	1.3
63.	*m*-Tolyl-$OCH_2C(CH_3)(OH)CH_2OH$	2.2	1.6	1.4
64.	*p*-Tolyl-$OCH_2C(CH_3)(OH)CH_2OH$	1.3	1.2	1.1
65.	*o*-Tolyl-$OCH_2CHOHCHOHCH_3$	2.3	1.9	1.2
66.	*o*-Tolyl-$OCH_2C(CH_3)(OH)CHOHCH_3$	2.5	3.9	0.6
67.	*o*-Tolyl-$OCH_2CHOHC(C_2H_5)_2OH$	1.9	1.6	1.2
68.	*o*-Tolyl-$OCH_2C(C_2H_5)(OH)CH_2OH$	2.6	2.8	0.9
69.	*o*-Tolyl-$OCH_2CHOHCHOHCH_2OH$	1.2	1.7	0.7
70.	*o*-Tolyl-$OCH(CH_2OH)CHOHCH_2OH$	0.9	1.3	0.7
71.	Phenyl-$OCH_2CHOHCH_2O$-phenyl	0.4	0.6	0.7
72.	*o*-Tolyl-$OCH_2CHOHCH_2OCH_3$	2.9	2.3	1.3
73.	*o*-Tolyl-$OCH_2CHOHCH_2OCH_2CH_2OH$	2.9	2.4	1.2
74.	*o*-Tolyl-$OCH_2CHOHCH_2OCH_2CH_2CH(CH_3)_2$	0.3	0.5	0.6
75.	*o*-Tolyl-$OCH_2CH(OCH_3)CH_2OCH_3$	1.6	1.1	1.5
76.	*o*-Tolyl-$OCH_2CHOHCH_2NH_2$	2.8	6.4	0.4
77.	*o*-Tolyl-$OCH_2CHOHCH_2NHCH_3$	3.3	7.4	0.4
78.	*o*-Tolyl-$OCH_2CHOHCH_2N(CH_3)_2$	2.8	6.7	0.4
79.	*o*-Tolyl-$OCH_2CHOHCH_2N(CH_3)_3I$	6.0	14.0	0.4
80.	*o*-Tolyl-$OCH_2CHOHCH_2NHCOOC_2H_5$	2.5	1.4	1.8
81.	*o*-Tolyl-$OCH_2CHOHCH_2NHCOOCH_2CH{=}CH_2$	1.3	2.3	0.6
82.	*o*-Tolyl-$OCH_2CHOHCH_2NHCOOCH_2CH_2CH_2CH_3$	0.9	0.8	1.1
83.	*o*-Tolyl-$OCH_2CHOHCH_2NHCOOCH(CH_3)CH_2CH_2CH_3$	0.6	0.8	0.8
84.	*o*-Tolyl-OCH_2COCH_3	3.5	2.9	1.2
85.	*o*-Tolyl-$OCH_2CH_2CH_2OH$	2.1	2.4	0.9
86.	*o*-Tolyl-$OCH_2CH_2C(CH_3)_2OH$	1.6	1.6	1.0
87.	*o*-Tolyl-$OCH_2CH_2COCH_3$	1.8	1.4	1.3
88.	*o*-Tolyl-$OCH_2CHOHCOOC_2H_5$	0.6	1.2	0.5
89.	*o*-Tolyl-$OCH_2CHOHCH{=}CH_2$	0.3	3.6	0.1
90.	*o*-Tolyl-$OCH_2CH(CH_2OH)CH{=}CH_2$	2.7	2.8	1.0
91.	*o*-Tolyl-$OCH_2CH_2OCH_2CH_2OH$	2.1	1.8	1.2
92.	Phenyl-$CHOHC(C_2H_5)_2OH$	2.5	1.7	1.5
93.	Phenyl-$CHOHCHOHCH_2OH$	0.4	0.5	0.8
94.	Phenyl-$CHOHCH_2CHOHCH_2OH$	0.4	0.6	0.7
95.	Phenyl-$C(CH_3)(OH)CH_2CHOHCH_2OH$	0.7	1.6	0.4
96.	Phenyl-$CH(CH_2OH)_2$	0.4	0.8	0.5
97.	Phenyl-$C(C_2H_5)(CH_2OH)_2$	1.5	1.9	0.8
98.	$(C_2H_5)_2C(CH_2OH)_2$	0.9	1.1	0.8
99.	$CH_3CH_2CH_2CH(CH_3)C(C_2H_5)(CH_2OH)_2$	2.7	2.3	1.2

action of Tolserol is the common sedative action to be expected of compounds carrying alkyl groups; or suitably selected and attached aryl groups; or whether it is activity specifically related to its being an ether of phenol.

CLINICAL APPLICATIONS OF MYANESIN

By EDWARD B. SCHLESINGER*

The neuromuscular disorders with which we are concerned are roughly of two types: involuntary movement and abnormal reflex phenomena. The first group, which includes the various dyskinesias, is secondary to bombardment of the peripheral motor apparatus by impulses arising centrally. The latter group consists in spasticity or hyperactive stretch response, mass reflex, and true muscle spasm. These states represent the release and facilitation or potentiation of reflex patterns and do not depend on central bombardment, but rather on its lack. Some states (such as rigidity) combine central and peripheral mechanisms.

* Presbyterian Hospital, New York, N. Y.

The response of these phenomena to drugs will depend on many complicating factors, including individual sensitivity and toxic side effects. Drugs of the atropine series which affect tremor and rigidity and presumably act at the basal ganglia level have no specific effect upon spasticity. On the other hand, in therapeutic doses, curare, which has a damping effect at the myoneural junction, has little or no therapeutic effect on tremor but a useful one on muscle spasm and spasticity. The unique property of myanesin is its ability to affect all these mechanisms, cerebral, brain stem, and cord. It is apparent clinically that the cell groups concerned with tremor and rigidity are the most sensitive, and that those in the cord concerned with spasticity much less so. The action on higher centers is not well understood. There is no question about the fact that myanesin is capable of producing sleep without reference to its muscle relaxant effect. We have repeatedly seen patients fall into what appeared to be natural sleep, at therapeutic levels. The Parkinson group seems particularly susceptible. The peripheral nerve and myoneural junction are affected least of all. This can be demonstrated electromyographically in slides. In the slides you can see that the marked rigidity rapidly dissolves during the administration of the first 50 cc. of 2% myanesin solution. When the characteristic pattern of rigidity is absent, one can still bring out the underlying abnormality of stretch response, which also disappears as the blood concentration is raised to a higher level.

How does myanesin act? A statement as to its mode of action would be pure speculation. The first apparent effect is at the brain stem level and seems to represent release phenomena—the nystagmus, etc., are probably based on physiological transection of the longitudinal fasciculus at a synaptic stem level. The particular specific response of tremor and rigidity to the drug without marked change in motor strength may signify a special sensitivity of some tract which mediates these impulses. The fact that the involuntary movement of athetosis and dystonia respond less well means either that the bombardment is by way of a different tract than rigidity and tremor or that the myanesin effect is directed against the mechanism of origin of the phenomena higher up rather than on a brain stem pathway to the periphery. Actually, whether one thinks in terms of tracts and synapses, pharmacological reactions, or enzyme systems, the explanation of the mode of action of myanesin still lies deep in the complex background of nervous mechanisms.

Clinically, it is obvious that the brain stem is early involved in the myanesin effect. The first symptom consists of circumoral paraesthesias and flushing (probably due to involvement of the spinal tract of the 5th nerve), followed by an increase in amplitude of horizontal nystagmus and then the appearance of vertical nystagmus. Tinnitus and loss of auditory acuity may follow.

At this same point, tremor and rigidity are visibly altered. It is not until later that the mechanisms responsible for athetosis, dystonia, and spasticity are affected.

These properties are the basis of the therapeutic use of myanesin. In doses which are not associated with serious toxic effects, the aforementioned abnormal mechanisms can be significantly altered.

What are the limiting factors? Route of administration, for one. In our hands, the desired effects are positively attained only by the intravenous route. For intramuscular use, the bulk necessary for 2%

solutions reduces its feasibility. Higher concentrations in solvents are much too irritating for routine use. We have studied a large group of cases, using oral medication in every conceivable pill, capsule, and suspension. The results are generally disappointing and, although occasionally there is a dramatic response, failure to obtain a worth-while effect is the rule. The evaluation of drug effects in chronic neurological disorders is a difficult scientific endeavor. It requires exhaustive controls and considerable passage of time before conclusions may be reached. Fundamentally, the patient is anxious to do well, and his objectivity is always questionable and of little value in the final quotient of subjective and objective data. This must always be kept in mind in the interpretation of clinical findings. The second limitation is the evanescence of clinical effect. Myanesin must be given fairly rapidly and a significant level maintained or the duration of action will be very brief. Interestingly enough, the longest effect after intravenous injection is in rigidity and tremor, where it may last from 4–5 hours. In spasticity, the effect is dissipated within 45 minutes and its major part much sooner. Other limitations lie in the tendency of the drug to cause phlebitis, which is a handicap to constant or repeated infusions. In high concentrations it may cause hemoglobinuria. In the 2% solution we have used, we have never seen it, but I know of several cases after oral medication.

Bearing these facts in mind—What place has myanesin in clinical therapy? Ruling out the experimental—and the action of the drug has fascinating neurophysiological implications—the indications in practice are strictly limited.

In the treatment of Parkinsonian tremor and rigidity, the dependence upon the intravenous route negates all but an occasional use. In crises, during which patients unaccountably or secondary to an intercurrent illness become much worse and refractory to their usual medication, hospital care with daily infusions of myanesin may be helpful in bringing the patient back to his usual plateau. There are other periods, infrequent but extremely difficult to manage, when myanesin is useful in handling such patients. After hip nailing, for example, it is impossible to maintain these patients at rest and the constant tremor often works out the pin or nail. Myanesin can be used to good effect in such an emergency.

In the treatment of the dyskinesias, myanesin is of little value unless it acts efficiently by mouth. Otherwise, its use is limited to the evaluation of deformities and for the rare instances of athetoid crises. These crises are frightening to behold and to attempt to ameliorate, and exhausting and even fatal to the patient. While barbiturates necessitate a great deal of special attention for the prevention of pulmonary complications, myanesin answers this remote problem very well.

Spasticity, or hyperactive stretch response, is seen in a multitude of neurological conditions, brain and cord injury, and degenerative diseases of the central nervous system, etc. The same difficulties of route of administration arise as in Parkinsonism. However, it is most important to the orthopedist and neurologist to know whether seeming deformities and contractures are reversible and thus amenable to physical therapy or static and requiring nerve and tendon cutting operations. Such evaluation can easily and safely be done under the effect of an injection of myanesin. The reduction in abnormal reflex response is positive and reliable. In general, it is important to put these limbs through a full range of

motion to prevent contractures. During the phase of abnormal reflex activity in reversible cord injuries or after tumor surgery, regular physiotherapy while the patient is relaxed by myanesin may make the difference between a smooth recovery and a multitude of corrective procedures.

For examination of spastic patients, instrumentation such as cystoscopy, and gynecological examination, the drug is most valuable in like fashion.

It is obvious that all the previously mentioned mechanisms are far removed from the ordinary demands of clinical practice. While a drug which will do these things might endear itself to the neurologist and orthopedist on occasion, it would spend most of its lifetime on a far rear shelf.

It is in the common wear and tear syndromes of everyday practice that myanesin should prove of most value. Skeletal muscle spasm is a factor of importance in the acute low back and frozen shoulder syndromes, the arthritides, and countless other acute disorders of the musculo-skeletal system. A drug which will break up the well-known vicious cycle of pain and muscle spasm is most welcome to the medical armamentarium. Long-term therapy is usually not as necessary as abrupt relief of the acute attack, and therefore the limitations of route of administration are not so important.

In the acute low back and cervical spine syndromes, the specific relaxant and analgesic effect of myanesin has a proper place. As an aid or substitute for traction, it is most efficient. In the treatment of the acute low back and disc syndromes, it seems to be of value in reducing acute muscle splinting and affording abrupt relief of pain. If the pain is in part due to the muscular changes, relief is dramatic and may be of long duration. If the pain is secondary to severe nerve root compression, the relief is followed by an equally rapid return of pain. This response has proven of real diagnostic aid in evaluating conservative treatment of herniation of the nucleus pulposus. Where pain returned shortly, or was inadequately relieved, we have never seen an adequate response to conservative treatment. In such cases, the root is probably compressed against the incarcerated lesion and cannot be freed by muscular relaxation or skeletal traction. The saving in time and money to the patient is considerable if a long and disappointing trial on bed rest can thus be avoided.

The treatment of vertebral fractures and dislocation consists in an attempt to exert traction in the proper axis so that, after achieving muscle fatigue, the structures will fall back into proper alignment. At times, the reactive muscle spasm and accompanying pain are most severe and make successful reduction difficult and slow to obtain. Myanesin has a real indication as an adjunct to such therapy and can both cut down the pain and hasten the reduction. For purposes of brevity, I shall not amplify this therapeutic approach any further, but its applications are obvious.

We have used myanesin in many other ways, some therapeutically remote, some of chiefly diagnostic interest. For example, for the evaluation of the role of muscle spasm in the arthritides of the spine, it has been a most useful tool. Temporary relief of pain is dramatic, as is restoration of mobility. Whether long-term ankylotic changes can be prevented by such treatment we must wait to see.

I should like to mention in detail only one other role in which the drug has been of real value. That is in the management of the motor manifestations of tetanus. These episodes are difficult to handle and

traditional therapeusis is notably inefficient. Curare is useful but most difficult to handle, and, I suspect, at times a party to the fatal outcome as often as a therapeutic triumph. In addition, it has a spinal cord excitant although a peripheral depressant action. In a disease characterized by excessive facilitation or excitation of spinal cord activity, it leaves room for improvement. Myanesin, as a spinal cord depressant and without the histamine side effects which seem to me to potentiate the shock of tetanus, is theoretically the perfect agent of treatment. We have found this to be so clinically, our only problem being in the prevention of the phlebitis from constant infusion. In parallel states, such as strychnine poisoning, myanesin should be equally applicable.

The value of myanesin in true convulsive states is limited to the emergency therapy of status epilepticus. Here it is very useful. In preventing injury during shock therapy, it has been disappointing. The threshold of convulsion is raised and the initial clonic phase softened, but this is only after large doses and not of dramatic degree.

To sum up, myanesin is a depressant of the motor system whose properties are more general than any of the traditional drugs. Its action is positive, predictable, and, where the indications are properly met, of impressive therapeutic value. Its chief limitation is the route of administration. This problem will undoubtedly be shortly solved—whether by a myanesin solvent or an analogue of myanesin, I cannot say. The major indication for use of the drug is true muscle spasm, preferably of acute types. I believe that here it will have its chief usefulness. Its other applications are of prime interest to the experimenter, neurologist, and orthopedist, but frankly of rather distant value to the everyday practitioner.

Note. The Division of Mycology held its inaugural meeting on October 22, 1948, at which Doctor Norman Conant, Duke University, Durham, North Carolina, presented a paper entitled *Sporotrichosis—Clinical, Epidemiological, and Immunological Aspects of the Infection*, which was illustrated by lantern slides. This has not been received for publication.

*SECTION OF ANTHROPOLOGY**

ANTHROPOLOGY IN MICRONESIA

By GEORGE PETER MURDOCK†

Micronesia consists of a series of archipelagoes in the mid-Pacific which stretch east and west for about 3,000 miles on and just north of the equator. The Gilberts and Nauru Island in the southeast are British. The rest of the area is administered by the United States—Guam as an American possession, the remainder of the Marianas Islands and all of the Caroline and Marshall Islands as a Trust Territory under the United Nations.

The United States Navy has for some years taken a special interest in these islands since it has been charged, first with the military task of wresting them from the Japanese and subsequently with the administrative task of governing their native inhabitants. Anthropologists have long been curious about the area because its ethnography has been little known, though suspected of containing clues es-

* The Section of Psychology held a meeting on October 18, 1948, at which Doctor Edmund Jacobson, Chicago, Ill., presented a paper entitled *A Theory of Essential Hypertension in Man*. This will appear in the December issue of TRANSACTIONS.

† Department of Anthropology, Yale University, New Haven, Connecticut. His address was delivered at the meeting of the Section on October 25, 1948.

sential to an understanding of culture history in the farther Pacific. During the past five years, these two interests have been joined in a series of common enterprises, which have resulted in the accumulation of a wealth of new information useful alike in the improvement of administration and in the solution of scientific and historical problems. Previous to that, the ethnography of Micronesia was for the most part known only from a German expedition 40 years ago.

This cooperation began in 1943 when, with several of my anthropological colleagues at Yale, I was called into the Navy to assemble all the known information on the area and to summarize it in a series of Civil Affairs Handbooks. It was continued after the war when the Navy asked Felix M. Keesing of Stanford University to assist in planning and operating a School of Naval Administration for the training of officers sent out to administrative posts in the Trust Territory. In 1946 another anthropologist, Douglas L. Oliver, was called upon to organize an Economic Survey of the area; four anthropologists, along with other specialists, spent several months in the major islands and produced a series of valuable, though largely unpublished, reports. The CIMA program—the Coordinated Investigation of Micronesian Anthropology—is the latest in this succession of cooperative ventures.

CIMA was made possible by a substantial appropriation from the Office of Naval Research to the Pacific Science Board of the National Research Council, supplemented by a generous grant from the Viking Fund, Inc., and by contributions from a number of participating institutions. With these funds, and with transportation, supplies, and local facilities also provided by the Navy, the Pacific Science Board has been able to send into Micronesia during 1947 and 1948 some 40 scientists from 22 different institutions—human geographers, linguists, physical anthropologists, and specialists in culture and personality, though the largest group have been general ethnologists or cultural anthropologists.

Since scientists will naturally be more interested in the results of the expedition than in the details of its organization and operations, I shall attempt a preliminary synthesis. It should be recognized that this will be in the highest degree tentative since, in addition to the findings of the Yale team on Truk, I have thus far seen only the final reports of Chave and Spoehr on the Marshalls, of Murphy on Mokil, and of Buck and Elbert on Kapingamarangi. These I have supplemented from my knowledge of the previous literature, from brief personal visits to Ponape and Palau, from a couple of days of intensive field work on Truk with natives from Puluwat, and from correspondence and brief conversations with some of those who have worked in Kusaie, Ponape, the Mortlocks, Ifalik, Yap, and Palau.

The main cultural divisions or subareas of Micronesia are by now fairly clear. Proceeding roughly from east to west, they are as follows:

1. The Gilbert Islands.
2. Nauru.
3. The Marshall Islands.
4. Kusaie, the easternmost of the Caroline chain.
5. Mokil and Pingelap.
6. Ponape and the adjacent atolls.
7. The Polynesian outliers of Nukuoro and Kapingamarangi.
8. The Nomoi or Mortlock group and nearby atolls.
9. Truk and the Hall Islands.
10. Puluwat, Pulusuk, and Pulap.
11. The so-called Central Carolines, *i.e.*, Ifalik, Woleai, and other atolls east of Yap and south of Guam.
12. The Marianas Islands, including Guam.
13. Yap, in the West Central Carolines.

14. Palau, including Angaur.
15. The Southwestern Islands, *i.e.*, Sonsorol, Pul, Merir, and Tobi, which stretch from Palau toward Dutch New Guinea.

Kusaie, Ponape, Truk, Yap, Palau, and all of the Marianas are so-called "high islands," being mainly volcanic in structure. The rest of Micronesia consists exclusively of "low islands"—78 atolls and 17 single coral islands. The total land area, inclusive of the British possessions, comprises about 1,250 square miles, inhabited by approximately 100,000 people of Micronesian stock.

The linguistic situation is beginning to emerge with some clarity. There are no Papuan or other non-Malayo-Polynesian languages in the area. The dialects of Yap, Palau, and the Marianas are sharply differentiated from all others, and are apparently affiliated more closely with the languages of the Philippines and Indonesia than with those farther out in the Pacific. Nukuoro and Kapingamarangi are specifically Polynesian. Rather surprisingly, however, they differ from all previously recorded dialects among the Polynesian outliers in not revealing a particularly close relationship to the Western Polynesian speech of Samoa and Tonga. They may even prove to be as distinct from Western as from Eastern Polynesian, in which case their speakers might well represent a remnant of the original Polynesian migrants rather than a later backwash as in Tikopia and Ontong Java. The languages of the rest of Micronesia, including apparently the four islands southwest of Palau as well as all those east of Yap, appear to be fairly closely related and probably deserve collectively the name "Micronesian." Though definitely distinct from Polynesian, their affiliations appear tentatively to point in this direction rather than toward Indonesia and the Philippines.

Since space is lacking to present an analysis of Micronesian culture in all its aspects, I shall confine myself to the field of social organization, and shall attempt some historical reconstructions in connection with a presentation of the distributional evidence. The principles applied are those described in my forthcoming volume on *Social Structure*, and hence need not be explained in detail here.

All the evidence points strongly to the presence of a bilateral social structure of Hawaiian type, coupled of course with the usual Southeast Asiatic tendency toward local endogamy, among the Malayo-Polynesian peoples prior to their wide dispersion. This type of organization predominates in Indonesia and in Polynesia, despite special local developments. In Melanesia, bilateral organization or traces thereof appear precisely among the populations most likely to have been intrusive, the more complex forms of social structure elsewhere being presumably derived from the aboriginal inhabitants prior to the eastward migration of Malayo-Polynesian speakers.

In Micronesia, Kapingamarangi and Nukuoro reveal a bilateral organization of characteristic Polynesian type, as might be expected from their linguistic affiliations. Everywhere else, except possibly in the Southwestern Islands, social structure is strongly matrilineal. How can we reconcile the prevalence of the matrilineate in Micronesia with our hypothesis of an earlier bilateral organization among all Malayo-Polynesians?

Strong support comes from an analysis of the kinship terminology. Any full-fledged unilinear structure, whether matrilineal or patrilineal, requires a fairly rich kinship vocabulary. There is a need, for example, to differentiate cross from parallel cousins, paternal from maternal aunts and uncles, sororal from fraternal

nephews and nieces. Matrilineal societies comparable to those of Micronesia exhibit such differentiation practically everywhere else in the world, whether in North or South America, in Asia, or in Africa. Micronesian kinship systems, by contrast, are marked by an extraordinary paucity of distinct terms. The Trukese, for example, get along with only eight elementary terms—father, mother, child, brother (woman speaking), sister (man speaking), sibling of the speaker's sex, spouse, and sibling-in-law of the speaker's sex. This paucity of terms, however, is specifically characteristic of bilateral structures of the Hawaiian or "generation" type, in which sibling terms are extended to all cousins, parental terms to all uncles and aunts, and terms for children to all nephews and nieces. To be sure, examples are not lacking in Micronesia of new terms developed for new categories of kinsmen, *e.g.*, cross-cousins, but the general impression is distinctly one of unilinear structures in a relatively early phase of adapting a limited vocabulary of traditional kinship terms to a new set of social complexities.

In a few places, this adaptive process seems scarcely to have begun. This is the case, for example, in Ifalik, according to information from E. G. Burrows. Elsewhere, however, the development has proceeded along one of the two lines followed by matrilineal societies all over the world, *i.e.*, toward terminology of the Iroquois or of the Crow type. Both Nauru and the Marshalls have taken the former path, retaining sibling terminology for parallel cousins but developing new words to designate cross-cousins. Ponape, the Mortlocks, Truk, Puluwat, and Yap have followed the other path, developing terminology of the Crow type by classifying the father's sisters' children with relatives of the parental generation and the mother's brothers' children with one's own or one's siblings' children.

Most of us would doubtless assume that, starting with a Hawaiian or "generation" system, the transition to an Iroquois system would require fewer internal readjustments than that to a Crow system. The Micronesian evidence belies this. Spoehr's excellent report on Majuro shows that the Marshallese, in converting the earlier Hawaiian into an Iroquois system, have found it necessary to develop at least three new terms—for maternal uncle, for sister's child (man speaking), and for cross-cousin of opposite sex. The Trukese, on the other hand, have been able to achieve a Crow system without inventing any new terms. They have simply taken the terms for "father" and "mother," which with typical Hawaiian economy were already used to designate uncles and aunts, grandparents, and parents-in-law as well as the actual parents, and have extended them to one additional category of relatives, namely, to all members of the father's matrilineal lineage irrespective of age, including of course the children of the father's sister. Reciprocal usage results in applying the term for "child" to the children of all the men of one's own lineage, including of course one's mother's brothers' children. Even today, Trukese kinship terminology conforms completely to the generation type in every respect except this reciprocal use of parent and child terms between the members of a matri-lineage and the children of the men of that lineage. This suffices, however, to convert the whole system into the characteristic Crow pattern.

The kinship structure of Micronesia thus yields clear internal evidence of derivation from the Hawaiian pattern which still survives nearly everywhere in Indonesia and Polynesia, and which comparative data demonstrate to be function-

ally associated with bilateral descent. The inference is inescapable that the matrilineate in Micronesia is a fairly recent development. Differentiation of kinship terminology would certainly have developed further if the ancestral Micronesians had already been matrilineal at the time of the original Malayo-Polynesian dispersion.

The problem thus arises of how the Micronesians acquired the matrilineate. My own cross-cultural researches abundantly support Lowie's hypothesis that unilinear descent normally springs from a unilocal rule of residence in marriage, either matrilocal or patrilocal. Such a residence rule assembles in one place—a village, a hamlet, or a ward—a group of males or females who are in fact unilinearly related, together with their inmarrying spouses. In time, proximity tends to emphasize the kinship of this central core of the local group and gradually to convert bilateral into unilinear descent. What may have happened in Micronesia is suggested by the situation in Borneo. On this island, matrilocal residence is the rule nearly everywhere. Descent, however, is still bilateral except in one isolated area. Here, in the Siong branch of the Maanyan tribe, actual exogamous matrilineal sibs have developed out of the groups aggregated by matrilocal residence. In Micronesia, presumably, a similar process started much earlier and has gone much farther, though not quite as far as in full-fledged matrilineal societies elsewhere in the world.

Although kinship adjustments to the matrilineate are only incipient, it should be emphasized that matrilineal descent itself is full-fledged everywhere in Micronesia (excepting, of course, the Polynesian outliers). In addition to lineages, there are exogamous matrilineal sibs in every sub-area, and sometimes these are very widely diffused. The identical sibs, for example, are found in the Mortlocks, Truk, and the Puluwat-Pulusuk group, and are strictly exogamous over the whole territory.

Not only is matrilineal descent fully elaborated throughout Micronesia, but in many places its original matrilocal basis has for some time been disintegrating. In Guam and the other Marianas, of course, the whole matrilocal-matrilineal system has long disappeared as a result of three centuries of intensive acculturation. Preliminary reports indicate that patrilocal residence is general in both Palau and Yap. For Majuro in the Marshalls, Spoehr reports that patrilocal is at least as common as matrilocal residence. Murphy's data reveal not only that residence in Mokil is exclusively patrilocal today, but also that a true patrilocal extended family organization has come into being. German reports indicate that patrilocal residence is also common or usual in Kusaie, Ponape, the Central Carolines, and the Southwestern Islands. Only in Nauru, the Mortlocks, Truk, and the Puluwat-Pulusuk area, apparently, is the earlier rule of matrilocal residence still intact.

The last three of these sub-areas seem to preserve approximately the type of organization that must once have prevailed throughout Micronesia, and in addition they reveal clearly the factors which have led to modifications elsewhere. The most basic structure is the exogamous matrilineage, localized in a hamlet or section of a village with its eldest competent male as lineage chief. Next in importance is the matrilocal extended family, consisting of a group of married sisters, mothers and daughters, or maternal aunts and nieces with their husbands and children. Third in order of significance is the exogamous matrilineal sib,

which clearly represents the end-product of fission and migration which have scattered the descendants of an original lineage. Spoehr's analysis of Marshallese social structure also emphasizes the primacy of the lineage and strongly corroborates the reconstruction here presented.

On Truk, we discovered two facts of the utmost importance for an understanding of the social history elsewhere in Micronesia subsequent to the acquisition of matrilineal sibs. The first of these is that patrilocal residence is an alternative of long standing in even this strongly matrilocal society. Genealogies extending back to 1800 or earlier demonstrate clearly that patrilocal residence has always occurred in circumstances under which a functioning matrilocal extended family did not exist or could not be established. For example, whenever a matrilineage is reduced to only one or two adult women, too few to maintain an efficient extended family, these women go to live with their husbands and participate in the latters' family and lineage organization. Obviously, this provides a precedent for an increasing frequency of patrilocal residence, such as is found widely elsewhere, whenever local conditions for any reason favor such a change.

Our second significant discovery on Truk was the germinal form out of which a feudal type of political organization and a complex system of social classes could easily evolve. Small feudal states with an elaborate class structure are found everywhere in Micronesia except in the central part of the Caroline chain—in the Puluwat-Pulusuk group, in Truk, in the Mortlocks, and of course in the Polynesian outliers of Nukuoro and Kapingamarangi. Petty warring states and stratification into noble and common classes of several levels characterize both the Marshalls and the Gilberts, and a similar class structure reappears in Nauru. In Kusaie and Ponape, paramount chiefs succeeded in achieving greater stability for their realms, and the former island was actually unified under a single petty king. Social stratification is pronounced in both instances. Skipping the stateless and classless areas in the middle Carolines, we encounter a strictly parallel elaboration of political and status institutions in western Micronesia. For the ancient Marianas, Thompson reports three social classes—nobles, commoners, and slaves—and a complex political structure based on land tenure, with local chiefs in rural districts and superior chiefs in the larger towns. Palau has a number of paramount chiefs, among whom two stand out above the rest, dividing the island into two complex and rivaling political systems. Yap has not achieved quite so high a degree of political integration, for the island is divided into a number of petty feudal states, but some of these have succeeded in extending their sovereignty over the atolls of the Central Carolines for hundreds of miles to the east. With respect to social stratification, however, Yap has gone farther than any other subarea, for the local culture recognizes no fewer than nine sharply differentiated social classes.

In Truk and the neighboring sub-areas, political integration has not gone beyond the level of the local community, which consists of a small island or a restricted district of a larger island, within which all the residents maintain daily face-to-face relations. Each such local community consists of a number of matrilineages belonging for the most part to different sibs. Each has its own land and is localized in a hamlet or a section of a village, where the married women of the lineage live with their husbands and children and where a men's house is maintained for

the occupancy of the unmarried boys above the age of puberty and of the older men of the lineage when visiting their relatives for social or ceremonial reasons. Political authority in the community is vested in a local chief, who is the head of one of the constituent lineages, typically the one which, according to local tradition, first settled the district. He enjoys theoretically a right of eminent domain over all the land in the community, the other lineages being deemed to have received their holdings from his, and in recognition of his primacy he receives a sort of rental from them in the form of periodic gifts and first fruits from the produce of the land. Lineage chiefs receive similar tribute from their own subjects. Local and lineage chiefs exercise considerable authority and enjoy a large measure of prestige, but they do not constitute a special social class. The influence they exercise is in essence that of the oldest brother over his younger siblings. Their status is official and personal, and does not have the effect, for example, of elevating their families above the general run of the population.

From these facts, it is easy to see how a feudal political structure and an elaborate system of social classes could evolve. All that was necessary to initiate the complexities found in eastern and western Micronesia was military conquest. War between local districts or communities was endemic in Truk and the neighboring atolls, but it rarely eventuated in conquest. It occasionally resulted in transferring the chiefship from one lineage to another within the local community, but victory in war almost never led to the seizure of the lands of the loser by the winner, their incorporation with his own holdings, and the imposition of tribute or feudal dues upon the conquered group, and when it threatened to do so, shifting alliances among communities usually rectified the situation in a new war.

In a situation like this, however, genuine conquest and the expropriation of land are always a strong likelihood. Once accomplished by an energetic chief, and maintained successfully over a period of time, this would automatically create a petty state uniting two or more local districts. Its organization would necessarily be feudal because based on land tenure and because the conqueror would inevitably demand tribute in accordance with the precedent of periodic gifts of produce from the land to lineage and local chiefs. The enhancement in power and wealth of the new paramount chiefs would greatly accentuate differences in status and encourage confining the succession within a particular family line. This would differentiate the families of rulers, and not alone the chief himself, from the general population. Moreover, defeated lineages whose lands had been expropriated would tend to sink into a condition of dependence and serfdom. In this way, social class distinctions would arise through the very same process that produced political integration.

Western Micronesia, and Ponape and Kusaie in the east, appear to represent the completion of this process with the achievement of relative political stability. In the Marshall Islands, and apparently also the Gilberts, stability has not yet been attained. Petty feudal states and a complex class structure have developed, to be sure, but conflict among paramount chiefs still continued bitter during the Discoveries Period, and their territories never became precisely defined and traditional as, for example, in Ponape and Yap. The Trukese and their immediate neighbors, with all the elements for such a transition already implicit in their own social structure and with examples of its

achievement both to the east and to the west, would almost certainly have initiated a parallel change within a very few generations if Europeans had not arrived to interfere with the process. In Micronesia, consequently, we have been able to catch "on the hoof," so to speak, a process of state development and class formation which has occurred in strikingly similar fashion in other parts of the world, *e.g.*, in Japan, in medieval Europe, and in parts of native Africa.

By way of conclusion, we may summarize the reconstructed socio-political history of Micronesia in the following probable stages:

1. Autonomous and endogamous local communities with a bilateral social organization of Hawaiian type, *i.e.*, the original Malayo-Polynesian social structure which still survives in various localities in both the near and the far Pacific.

2. A similar bilateral organization in which the rule of residence has become normally matrilocal, as in Borneo.

3. A matrilineal organization consisting of exogamous matri-lineages localized in hamlets, arising on the basis of matrilocal residence, with several such hamlets within the still autonomous and endogamous community.

4. A full-fledged matrilineate consisting not only of lineages but also of exogamous sibs developed in consequence of fission and migration, but with as yet no adaptive modification of the original Hawaiian kinship terminology. Ifalik and the nearby atolls in the Central Carolines are still apparently at this level.

5. A matrilineal organization of the same type in which adaptive changes in kinship terminology have produced Iroquois systems in some regions and Crow systems in others. The Mortlock, Truk, and Puluwat-Pulusuk sub-areas are still at this level.

6. A matrilineal social organization characterized by a marked increase in the prevalence of patrilocal residence, accompanied by a feudal political organization of unstable petty states and by stratification into several differentiated social classes. The Marshall Islands are typical of this level.

7. A social structure with matrilineal sibs and exogamy but with patrilocal residence, patrilineal inheritance, and at least a tendency toward patrilineal succession, accompanied by a stable political organization of petty feudal states with traditionally recognized territories and by a highly elaborate system of social classes. Yap clearly typifies this final level of development, which is also at least approached with various degrees of closeness in Kusaie, Ponape, Palau, and the pre-Spanish Marianas.

Note. The Section of Physics and Chemistry held a meeting on October 5, 1948, at which Doctor William F. G. Swann, Bartol Research Foundation, Swarthmore, Pennsylvania, presented a paper entitled *New Problems in Cosmic Rays*, which was illustrated by lantern slides. This has not been received for publication.

CONFERENCE HELD

SECTION OF BIOLOGY

CONFERENCE ON "AUREOMYCIN—A NEW ANTIBIOTIC":
JULY 21, 1948

The Section of Biology held a Conference on "Aureomycin—A New Antibiotic." Doctor A. R. Dochez, Presbyterian Hospital, New York, N. Y., was the Conference Chairman in charge of the meeting. Doctor Charles R. Schroeder, Lederle Laboratories Division, American Cyanamid

Company, Pearl River, N. Y., was the Presiding Chairman at all sessions.

The program consisted of the following papers:

Wednesday, July 21

Morning Session. "Aureomycin, a Product of the Continuing Search for New Antibiotics," by B. M. Duggar, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

"Pharmacology of Duomycin," by R. W. Cunningham, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

"Bacteriological Studies of Aureomycin," by C. W. Price, W. A. Randall, and H. Welch, Food and Drug Administration, Washington, D. C.

"Use of Aureomycin on Some Experimental Infections in Animals," by P. A. Little, Lederle Laboratories Division American Cyanamid Company, Pearl River, N. Y.

"Action of Aureomycin Against Experimental Rickettsial and Viral Infections," by S. C. Wong and H. R. Cox, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

"The Determination of Aureomycin in Serum and Other Body Fluids," by A. C. Dornbush, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

Afternoon Session. "Treatment of Lymphogranuloma Venereum and Granuloma Inguinale in Humans with Aureomycin," by L. T. Wright, M. Sanders, M. A. Logan, A. Prigot, and L. M. Hill, Harlem Hospital, New York, N. Y.

"Aureomycin in Ocular Infections," by A. E. Braley and M. Sanders, College of Physicians and Surgeons, Columbia University, New York, N. Y.

"Laboratory Studies with Aureomycin," by T. F. Paine, Jr., H. S. Collins, and M. Finland, Boston City Hospital, Boston, Massachusetts.

"Clinical Studies with Aureomycin," by M. Finland, H. S. Collins, and T. F. Paine, Jr., Boston City Hospital, Boston, Massachusetts.

"*In Vitro* Studies with Aureomycin," by C. A. Chandler and E. A. Bliss, Johns Hopkins School of Medicine, Baltimore, Maryland.

"Treatment of Experimental Infections with Aureomycin," by M. S. Bryer and E. B. Schoenbach, Johns Hopkins School of Medicine, Baltimore, Maryland.

"The Pharmacological and Clinical Trial of Aureomycin," by E. B. Schoenbach, M. S. Bryer and P. H. Long, Johns Hopkins School of Medicine, Baltimore, Maryland.

"Studies on Serum Concentrations in Humans and Preliminary Observations on the Treatment of Human Infections with Aureomycin," by H. F. Dowling, M. H. Lepper, and L. K. Sweet, Gallinger Municipal Hospital, Washington, D. C.

Evening Session. "Aureomycin—A New Antibiotic with Antirickettsial Properties: Its Effect on Experimental Spotted Fever and Epidemic Typhus," by L. Anigstein, D. M. Whitney, and J. Beninson, Rickettsial Research Laboratory, Department of Preventive Medicine and Public Health, University of Texas, Galveston, Texas.

"Treatment of Q Fever in Man with Aureomycin," by E. H. Lennette, Viral and Rickettsial Disease Laboratory, California State Department of Public Health, Berekeley, California; G. Meiklejohn, Viral and Rickettsial Disease Laboratory, California State Department of Public Health, Berkeley, California and Division of Medicine, University of California Medical School, San Francisco, California; H. M. Thelen, Vacaville, California.

NEW MEMBERS

A. Elected from May 14, 1948, to September 15, 1948

LIFE MEMBERSHIP

Berberian, Dicran A., M.D. Bacteriology, Parasitology, Tropical Medicine. Senior Investigator in Chemotherapy, Sterling-Winthrop Research Institute, Rensselaer, N. Y.

SUSTAINING MEMBERSHIP

Creasy, William N., Phm.B., Pharmaceutical Industry. President and General Manager, Burroughs Wellcome & Co. (U.S.A.) Inc., New York, N. Y.

Daiell, Harvey L., M.D., Clinical Research, Pharmaceutical Industry. Vice-Pres. and Scientific Director, Lakeside Laboratories, Inc., Milwaukee 11, Wis.

Dounce, Alexander, L., Ph.D., Biochemistry. Assistant Professor Biochemistry, Strong Memorial Hospital, Rochester, N. Y.

Edgar, David S., Jr., A.B., Virus, Biology. Executive Vice-President and General Council, National Canine Research Foundation, New York, N. Y.

Karlton, Sidney M., B.S., Medical Research. Director Medical Research, Pyridium Corporation; Nepera Chemical Co. Inc., Yonkers, N. Y.

Pantzer, Myron, B.S., Organic Chemistry. Manufacturing, Brooklyn, N. Y.

Rhoads, Cornelius P., M.D., Experimental Medicine & Pathology. Director, Memorial Hospital, New York, N. Y.

Sehnert, Marion P., Artist, New York, N. Y.

Soffer, Louis J., M.D., Medicine, Endocrinological Research. Assistant Clinical Professor of Medicine, Columbia University, New York, N. Y.

Stern, Arthur B., M.D., Biology, Psychology, Physics, Chemistry. Private Practice, Brooklyn, N. Y.

Talbot, Timothy R., Jr., M.D., Medicine. Associate Member, Sloan-Kettering Institute, New York, N. Y.

Ver Brugghen, Adrien, M.D., Neurosurgery. Clinical Professor of Surgery, University of Illinois, Chicago, Ill.

Webb, Augustus, C., M.D., Biological and Medical Research. Pathologist, Coroner's Office, Cook County, Ill.

Weller, Carl V., M.D., Pathology. Professor of Pathology, University of Michigan, Ann Arbor, Mich.

Wilson, James L., M.D., General Surgery. Associate Visiting Surgeon, Harlem Hospital, New York, N. Y.

Wright, Arthur W., M.D., Pathology, Cancer, Aging, Thyroid Diseases. Professor of Pathology, & Bacteriology, Albany Medical College, Albany, N. Y.

ACTIVE MEMBERSHIP

Accettola, Charles N., M.D., Internal Medicine, Hematology. Private Practice, Staten Island, N. Y.

Anderson, John M., Ph.D., Invertebrates, Insects. Instructor, Department of Biology, Brown University, Providence, R. I.

Angier, Robert B., Ph.D., Chemistry. Research Chemist, Pearl River, N. Y.

Archer, Sydney, Ph.D., Organic & Pharmaceutical Chemistry. Chemist, Sterling-Winthrop Research Institute, Rensselaer, N. Y.

Argonz, Joaquin, M.D., Biology. Medical Assistant, Rivadavia Hospital, Buenos Aires, Argentina.

Ayres, Gilbert B., Ph.D., Biochemistry, Bacteriology. Superintendant of Penicillin Production, Lederle Laboratories Division American Cyanamid Co., Pearl River, N. Y.

Baer, Rudolf L., M.D., Dermatology, Immunology. Instructor in Dermatology and Syphilology, New York Post-Graduate Hospital, New York, N. Y.

Baker, Laurence S., B.A., Psychology. Student Graduate, New York University, New York, N. Y.

Barker, Joseph W., Sc.D., Research Administration. President, Research Corporation, New York, N. Y.

Bateman, Jeanne C., M.D., Medicine, Instructor, College of Medicine, New York University, New York, N. Y.

Bauman, Louis, M.D., Biochemistry, Internal Medicine. Assistant Professor of Clinical Medicine, Columbia University, New York, N. Y.

Baumgarten, Werner, Ph.D., Biochemistry. Research Chemist, Merck & Co., Rahway, N. J.

Behre, Jeanette A., Ph.D., Biochemistry. Associate, Department of Biochemistry, College of Physicians and Surgeons, New York, N. Y.

Bellak, Leopold, M.D., Psychiatry. Associate Psychiatrist, Flower Hospital; Fifth Avenue Hospital, New York, N. Y.

Bertrand, Louis G., M.D., Biology, Immunology, Allergy. Ciba Pharmaceutical Co., Summit, N. J.

Biesele, John J., Ph.D., Cancer Cytology & Cytochemistry. Associate & Head of Department of Cell Growth, Sloan-Kettering Institute, New York, N. Y.

Bieter, Raymond N., M.D., Ph.D., Pharmacology. Professor and Head Department of Pharmacology, University of Minnesota, Minneapolis, Minn.

Billard, Gordon Y., B.S., Investments. Partner, J. R. Williston & Co., New York, N. Y.

Birnberg, Charles H., M.D., Female Sex Endocrinology. Assoc. Obstetrician, Brooklyn Jewish Hospital, Brooklyn, N. Y.

Birnie, James H., Ph.D., Biology. Associate Professor of Zoology, Syracuse University, Syracuse, N.Y.

Blumberg, Harold, Sc.D., Pharmacology, Nutrition. Head, Biology Laboratories, Endo Products, Richmond Hill, N. Y.

Bocobo, Florante, M.D., Medical Mycology. Instructor, University of the Philippines, Manila, P. I.

Bonnycastle, Desmond D., Ph.D., Pharmacology. Assistant Professor of Pharmacology, Yale School of Medicine, New Haven, Conn.

Bowman, Wendell E., Ph.D., Clinical Endocrinology. Chemist, Sloan-Kettering Institute, New York, N. Y.

Breindel, Arthur W., A.B., Biochemistry. Medical Research Assistant, New York, N. Y.

Breinin, Goodwin M., M.D., Ophthalmology, Pathology, Cytology. Resident in Ophthalmology, Beth Israel & Bellevue Hospitals, New York, N. Y.

Buckman, Robert J., M.D., Clinical Research. Medical Director, The Wm. S. Merrell Company, Cincinnati, O.

Burchenal, Joseph H., M.D., Cancer Research. Associate, Sloan-Kettering Institute for Cancer Research, New York, N. Y.

Carlquist, Philip R., C.P.H., Bacteriology. Chief, Department of Bacteriology, Army Medical Department Research & Graduate School, Army Medical Center, Washington, D. C.

Chapman, Earle M., M.D., Medicine. Instructor of Medicine, Harvard Medical School, Boston, Mass.

Chemerda, John M., Ph.D., Chemistry. Chemist, Merck & Co., Rahway, N. J.

Clare, Norman T., M.Sc., Biochemistry, Physiology. Chief Biochemist, Ruakura Animal Research Station, New Zealand Department of Agriculture, Hamilton, New Zealand.

Clark, Clarence C., Ph.D., Physics, Mamology. Professor of Science, New York University, New York, N. Y.

Clark, Robertson B., Medical Sciences. President, Clark Drug Company, Inc., Phoenix, Ariz.

Claghorn, Robert A., M.D., D.Sc., Psychosomatic Research in Psychiatry. Assistant Professor of Psychiatry; Lecturer in Medicine, McGill University, Montreal, Que., Canada.

Coe, Frederick W., M.D., Medicine, (Botany). Resident in Internal Medicine, Episcopal Hospital, Philadelphia, Pa.

Colwin, Arthur L., Ph.D., Biology. Assistant Professor in Biology, Queens College, Flushing, L. I., N. Y.

Combes, Frank C., M.D., Medicine. Chairman Department of Dermatology, New York University, New York, N. Y.

Coodin, Fischel J., M.D., Pathology and Biology. Resident in Pathology, Christ Hospital, Jersey City, N. J.

Crowe, Bernard F., M.S., Organic Chemistry. Student, Fordham University, New York, N. Y.

Culver, Perry J., M.D., Internal Medicine, Nutrition. Clinical Fellow, Massachusetts General Hospital, Boston, Mass.

Custer, Alfred W., B.S., Pharmacology, Psychology. Administrative Department, Ciba Pharmaceutical Products, Summit, N. J.

Daly, Marie M., Ph.D., Biochemistry. Instructor, Howard University, Washington, D. C.

Davis, John S., Jr., M.D., Medicine. Assistant Professor of Medicine, Post Graduate School, Columbia University, New York, N. Y.

Dekker, Charles A., Ph.D., Biochemistry, Research Assistant, Sterling Hall of Medicine, Yale University, New Haven, Conn.

Del Castillo, Enrique B., M.D., Biology. Associate Professor of Medicine, Facultad de Ciencias Medicas, Buenos Aires, Argentina.

Derrow, David D., B.A., Parasitology. Research Parasitologist, U. S. Army Medical Corps, Orangeburg, N. Y.

Dessau, Frederick I., M.D., Pathology. Research Pathologist, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

Diaz-Rivera, Rurico S., M.D., Internal Medicine, Cardiology. Chief of Medical Services of the City Hospital, San Juan, P.R.

Dondero, Norman C., M.S., Bacteriology. Instructor in Animal Diseases, University of Connecticut, Storrs, Conn.

Dougherty, Gregg, Ph.D., Organic Chemistry. Professor, Frick Laboratory, Princeton University, Princeton, N. J.

Drill, Victor A., M.D., Liver Injury, Endocrines, Vitamins. Professor of Pharmacology, Wayne University, Detroit, Mich.

Duran-Reynals, Francesco, M.D., Host-parasite relationships; viruses; cancer. Research Professor (Associate rank), Yale University School of Medicine, New Haven, Conn.

Eckhardt, Richard D., M.D., Nutrition, Liver Diseases. Research Fellow, Boston City Hospital, Boston, Mass.

Eirich, Frederick R., Ph.D., Sc.D., Physical Chemistry, Colloid Science, Polymer Research, Biochemistry. Assistant Professor, Colloid & Polymer Science, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Eisenberg, Harold J., M.D., Pediatrics, Medicine. Instructor, New York University College of Medicine, New York, N. Y.

Elftman, Herbert, Ph.D., Anatomy. Associate Professor of Anatomy, College of P. & S., Columbia University, New York, N. Y.

Epstein, Joseph, M.D., Neurosurgery, Neurophysiology. Research Fellow, Neurophysiology, Yale University, New Haven, Conn.

Esserman, Paul R., M.D., Medicine. Assistant Resident, Bellevue Hospital, New York, N. Y.

Faloon, William W., M.D., Metabolic Disease & Oncology. Assistant Professor of Oncology, Albany Medical College, Albany, N. Y.

Foster, Robert H. K., Ph.D., M.D., Pharmacology. Associate Professor of Pharmacology, St. Louis University School of Medicine, St. Louis, Mo.

Fraad, Lewis M., M.D., Pediatrics. Instructor in Pediatrics, Cornell Medical School, New York, N. Y.

Freixas, Carmen L., M.D., Biology. Laboratory Technician, St. Barnabas Hospital, New York, N. Y.

Gabel, Alfred, M.D., Biology, Psychology. Medical Staff, Bellevue Hospital, New York, N. Y.

Gazzola, Albert L., B.S., Pharmaceutical Chemistry. Research Associate, Lederle Laboratories, Pearl River, N. Y.

Gitlin, Irving J., M.A., Biology, Social Psychology. Science Researcher, Columbia Broadcasting System, New York, N. Y.

Gitlitz, Abraham J., M.D., Blood Diseases. Director of Laboratories, Christ Hospital, Jersey City, N. J.

Glick, Dudley P., Ph.D., Bacteriology, Public Health, Agriculture. Director of Biological Control Sharp & Dohme Inc. Glen Olden, Penna.

Gluck, Martin, M.D., Internal Medicine. Private Practice Syracuse N. Y.

Goldberger, Emanuel, M.D., Cardiology. Lecturer in Medicine, Columbia University, New York, N. Y.

Goldwater, Leonard J., M.D., Industrial Hygiene. Professor of Industrial Hygiene, Columbia University, New York, N. Y.

Gordon, Harold M., M.D., Internal Medicine. Assistant Resident Neoplastic Diseases, Montefiore Hospital, New York, N. Y.

Greene, Justin L., M.D., Physiology, Psychology. Assistant Neurologist, Neurological Institute; Vanderbilt Clinic, New York, N. Y.

Grenfell, Frederick A., D.V.M., Veterinary Medicine.

Veterinarian, U. S. Bureau of Animal Industry, Pearl River, N. Y.

Griffin, Grace E., M.S., Biochemistry. Research Assistant, Long Island College of Medicine, Brooklyn, N. Y.

Grobstein, Clifford, Ph.D., Biology. Biologist, National Cancer Institute, Bethesda, Md.

Gross, Erwin, G., Ph.D., M.D., Pharmacology. Professor and Head, Department of Pharmacology, State University of Iowa, Iowa City, Ia.

Grossman, Milton S., M.A., Physiology. Student, Boston University, Boston, Mass.

Gumble, Adaline R., B.S., Parasitology. Research Parasitologist. Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

Hamblen, E. C., M.D., F.A.C.S., Endocrinology. Professor, Duke University School of Medicine, Durham, North Carolina, by invitation.

Hamill, Marjorie, B.M., Singer, Psychology, Psychiatry. Chicago Opera, Inc., Chicago, Ill.

Harrington, William J., M.D., Hematology. Assistant Resident, Boston City Hospital, Boston, Mass.

Harris, Isaac F., Ph.D , Chemistry of Nutrition. Private Research, Rye, N. Y.

Harris, Meyer M., M.D., Internal Medicine, Endocrinology and Metabolism. Principal Research Internist, New York State Psychiatric Institute, New York, N. Y.

Harten, Max, M.D , Allergy. Adjunct Attending Physician, Allergy, Jewish Hospital of Brooklyn, Brooklyn, N. Y.

Hayashi, Teru, Ph.D., Cellular Physiology. Assistant Professor in Zoology, Columbia University, New York, N. Y.

Henderson, Edward, Ph.D., M.D., Medicine. Director of Clinical Research, Schering Corporation, Bloomfield, N. J.

Herrold, Kenneth F., Ed.D., Social Psychology. Faculty, Department of Guidance, Teachers College, Columbia University, New York, N. Y.

Hershkowitz, Melvin, M.D., Medicine. Resident Pathologist, Metropolitan Hospital, New York, N. Y.

Herstein, Karl M., B. S., Chemistry. President, Herstein Laboratories, Inc., New York, N. Y.

Hewitt, William L., M. D., Infectious Diseases, Bacteriology, Chemotherapy. Instructor in Medicine, Boston University Medical School, Boston, Mass.

Hughes, Edward C., M.D., Obstetrics, Gynecology, Endocrinology. Professor of Obstetrics, Syracuse University; Chief Obstetrician, Syracuse Memorial Hospital, Syracuse, N. Y.

Ingle, Dwight J., Ph.D., Endocrine Physiology. Senior Research Scientist, The Upjohn Company, Kalamazoo, Mich.

Irwin, Leslie, M.D., Biochemistry and Metabolism. Fellow in Internal Medicine, Goldwater Memorial Hospital, New York, N. Y.

Jackson, Sidney J., B.S., Biology, Physics, Chemistry. Professional Service Director, Endo Products Inc., Richmond Hill, N. Y.

Jacobson, Seymour B., M.D., Otolaryngology, Allergy. Assistant Otolaryngologist, N. Y. Post-Graduate Hospital, New York, N. Y.

Jacquez, John A., M.D., Cancer, Electro Microscopy. Fellow, Sloan-Kettering Institute for Medical Research; Visiting Investigator, Rockefeller Institute for Medical Research, New York, N. Y.

Jessner, Max, M.D., Dermatology and Syphilology. Assistant Professor of Dermatology and Syphilology, New York Post Graduate Medical School, New York, N. Y.

Jezer, Abraham, M.D., Cardiology. Assistant Clinical Professor of Medicine, Columbia University, New York, N. Y.

Johnson, Alan J., M.D., Internal Medicine, Enzymology. Fellow in Medicine, New York University, New York, N. Y.

Kershner, David, M.D., General Surgery. Attending Surgeon, Beth-El Hospital, Brooklyn, N. Y.

Kohn, Jerome L., M.D., Medicine, Pediatrics. Attending Physician, Willard Parker Hospital, New York, N. Y.

Koons, Thomas A., M.D., Physiology. Resident in Medicine, Sea View Hospital, Staten Island, N. Y.

Kraus, Charles A., Sc.D., Physical and Inorganic Chemistry. Professor of Chemistry, Brown University, Providence, R. I.

Kuczynski, George C., Sc.D., Physics of Solids. Project Leader in Met. Lab., Sylvania Electric Products, Bayside, N. Y.

Kuhn, Lesley, Ph.D., Psychology. Author, Editor, "Your Mind Psychology Digest," New York, N. Y.

Kustermann, Stuart D., M.D., Pathology. Resident in Pathology, Philadelphia General Hospital, Philadelphia, Pa.

Langlykke, Asger F., Ph.D., Microbiology. Director, Microbiological Development, E. R. Squibb & Sons, New Brunswick, N. J.

Laufer, Ira Jerome, B.A., Biology. Graduate Student, University of Pennsylvania, Philadelphia, Pa.

Leavitt, Milo D., Jr., M.D., Internal Medicine, Physiology. Physician, Mayo Clinic, Rochester, Minn.

Leftwich, William B., M.D., Medicine. Research Fellow, National Institute of Health, Bethesda, Md.

Lemon, Henry M., M.D., Metabolic Diseases and Neoplasma. Assistant Professor of Medicine, Boston University School of Medicine, Boston, Mass.

Leslie, Stephen H., M.D., Metabolism, Endocrinology. Clinical Assistant, Department of Medicine, New York University College of Medicine, New York, N. Y.

Levy, Sidney, M.S., Psychology. Research Associate; Instructor in Psychology, New York University, New York, N. Y.

Lewis, John B., Ph.C., Biology. Director of Research, S. F. Durst & Company, Inc., Philadelphia, Pa.

Litchfield, Harry R., M.D., Biochemistry, Clinical Research. Attending Pediatrician, Beth-El Hospital; Brooklyn Womens Hospital; Brooklyn Thoracic Hospital, Brooklyn, N. Y.

Loew, Earl R., Ph.D., Pharmacology. Associate Professor of Pharmacology, University of Illinois College of Medicine, Chicago, Ill.

Loewe, Leo, M.D., Thromboembolic Disease. Attending Physician, Jewish Hospital, Brooklyn, N. Y.

Lorz, Doris C., M.S., Biochemistry. Wellcome Research Laboratories, Tuckahoe, N. Y.

Loscalzo, Anthony E., M.D., Medicine, Psychiatry. Attending Neuropsychiatrist, Mother Cabrini Hospital, New York, N. Y.

Luger, Norton M., M.D., Biology. Resident in Medicine, Halloran V. A. Hospital, Staten Island, N. Y.

McCormack, James E., M.D., Internal Medicine. Assistant Dean, College of Medicine, New York University, New York, N. Y.

McIntire, Floyd C., Ph.D., Biochemistry. Research Biochemist, North Chicago, Ill.

Maclay, William N., B.S., Physical Chemistry. Research Assistant, Department of Chemistry, Yale University, New Haven, Conn.

Malament, Sylvia G., A.B., Chemistry. Research Assistant, Maltine Co., Morris Plains, N. J.

Marinelli, Leonidas, D., M.A., Application of Isotopes to Radiological Physics, Medical & Biological problems. Physicist, Memorial Hospital; Sloan-Kettering Institute for Medical Research, New York, N. Y.

Marks, Morris S., M.D., Chemistry, Biology. Urologist and Surgeon, Private Practice, New York, N. Y.

Mautner, Hans, M.D., Biology. Senior Physician, Wrentham State School, Wrentham, Mass.

Maynert, Everett W., Ph.D., Chemistry, Pharmacology. Research Associate, Columbia University, New York, N. Y.

Megibow, Raymond S., M.D., Biology, Physics. Research Assistant, Rosenstock Foundation, New York, N. Y.

Michaelson, Solomon, D.V.M., Pharmacology, Nitrofuran Toxicology, Chemotherapy. Pharmacologist, Eaton Laboratories, Inc., Norwich, N. Y.

Minard, David, Ph.D., M.D., Physiology. Head of Physiology Faculty, Naval Medical Research Institute Bethesda, Md.

Moolten, Sylvan E., M.D., Internal Medicine, Pathology. Director of Laboratory, St. Peter's General Hospital; Middlesex General Hospital, New Brunswick, N. J.

Moskovic, Samuel, Physiology. Teaching Fellow, New York University, New York, N. Y.

Mote, John R., M.D., Medicine. Medical Director, Armour Laboratories, Chicago, Ill.

Munson, Paul L., Ph.D., Biochemistry and Endocrinology. Head of Endocrinology Research Section, Armour and Co., Chicago, Ill.

Murphy, James S., M.D., Cytology. Private practice, New York, N. Y.

Newburger, Robert A., M.D., Metabolism and Gerontology. Research Associate, Home for Aged and Infirm Hebrews, New York, N. Y.

Nickson, James J., M.D., Radiotherapy and Radiobiology. Senior Fellow, American Cancer Society, and Associate Member, Sloan-Kettering Institute, New York, N. Y.

Nittis, Savas, M.D., Medicine. Assistant Clin. Professor of Medicine, New York Medical College, New York, N. Y.

Novel, Ruth S., Ph.D., Physiological Chemistry. Assistant Professor, Hunter College, New York, N. Y.

Oliva-Paz, Carlos E. De, D.D.S., Dentistry, Biological Sciences. Dental Consultant to Argentine Government, Buenos Aires, Argentina.

Opler, Stanley R., M.D, Pathology, Medicine. Resident in Pathology, Dept. of Pathology, New York Medical College, New York, N. Y.

Oppenheim, Abraham, M.D., Surgery, Oncology. Private Practice, New York, N. Y.

Osborn, Clinton, Ph.D., Endocrinology and Pigmentation. Associate Professor of Zoology, Syracuse University, Syracuse, N. Y.

Pabst, Marvin L., M.S., Endocrinology. Pharmacologist, The Upjohn Company, Kalamazoo, Mich.

Perlmutter, Martin, M.D., Endocrinology, Metabolism. Research Associate, Maimonides Hospital, Brooklyn, N. Y.

Petering, Harold G., Ph.D., Biochemistry. Research Chemist, The Upjohn Company, Kalamazoo, Mich.

Pfeiffer, Carl C., Ph.D., M.D., Pharmacology. Professor of Pharmacology, University of Illinois, College of Medicine, Chicago, Ill.

Pierce, John G., Ph.D., Biological Chemistry. Research Fellow, Cornell University, New York, N. Y.

Platt, Henry, M.Ed., Psychology. Clinical Psychologist, Neuropsychiatric Service, Halloran Veterans Hospital, Staten Island, N. Y.

Plotz, Milton, M.D., Medicine. Associate Professor of Clinical Medicine, Long Island College of Medicine, Brooklyn, N. Y.

Poser, Charles M., B.S., Medicine. Student, College of Physicians & Surgeons, Columbia University, New York, N. Y.

Post, Joseph, M.D., Medicine, Liver Disease, Metabolism. Assistant Professor of Clinical Medicine, N. Y. University College of Medicine, New York, N. Y.

Powers, E. L., Jr., Ph.D., Genetics, Microorganisms. Biologist, Argonne National Lab., Chicago, Ill.

Prins, Daniel A., Ph.D., Organic Chemistry, Biochemistry. Member Staff, Research Division, Cleveland Clinic, Cleveland, O.

Probst, Everett W., M.D., Toxicology and Occupational Diseases. Medical Director, Remington Rand Corporation, New York, N. Y.

Rappaport, Irving, Ph.D., Parasitology. Philip A. Benson Memorial Fellow, L. I. College of Medicine, Brooklyn, N. Y.

Rasquin, Priscilla, B.A., Biology of Fishes. Scientific Assistant, Department of Fishes & Aquatic Biology, American Museum of Natural History, New York, N. Y.

Ratnoff, Oscar D., M.D., Internal Medicine, Experimental Pathology of the Liver. Fellow, Johns Hopkins University School of Medicine, Baltimore, Md.

Reese, John D., M.D., Pathology, Bacteriology. Chairman, Depts. of Pathology & Bacteriology, University of Mississippi, University, Miss.

Reid, James D., Sc.D., Microbiology. Professor of Bacteriology and Parasitology, Medical College of Virginia, Richmond, Va.

Resnik, Ernest D., M.D., Gynecology & Obstetrics. Private Practice, Brooklyn, N. Y.

Ridge, Gerald K., M.D., Pathology and Rheumatic Diseases. Pathology Instructor, University of Southern California School of Medicine, Ventura, Cal.

Rietz, Jane E., B.S., Biochemistry. Abstractor, Lederle Laboratories, New York, N. Y.

Robinette, Hillary, Jr., A.B., Chemistry. Publicker Industries, Inc., Philadelphia, Pa.

Rodnan, Gerald P., Biology. Medical Student, Long Island College of Medicine, Brooklyn, N. Y.

Rogers, Stanfield, M.D., Virus and Cancer Research. Jane Coffin Childs Fellow, Rockefeller Institute for Medical Research, New York, N. Y.

Ronis, Norman, B.A., Neurology. Graduate Student, N. Y. University, New York, N. Y.

Rosenberg, Henry N., M.D., Internal Medicine. Instructor in Medicine, Boston University School of Medicine, Boston, Mass.

Rouse, Irving, Ph.D., Anthropology. Associate Professor of Anthropology, Yale University, New Haven, Conn.

Rozendaal, H. M., M.D., Biology. Research Associate, G. E. Research Laboratory, Schenectady, N. Y.

Rudzinska, Marie A., Ph.D., Protozoology. Instructor, New York University, New York, N. Y.

Ruttenburg, Alexander M., M.D., Surgery, Cancer Research. Assistant Resident, Beth Israel Hospital, Boston, Mass.

Sapin, Samuel O., M.D., Medicine. Interne, Mt. Sinai Hospital, New York, N. Y.

Schenck, J. R., Ph.D., Biochemistry, Antibiotics. Research Biochemist, Abbott Labs., Chicago, Ill.

Schramm, John E., Industrial Application of Discoveries in Chemistry & Physics. Research Laboratories, Inc., Oakdale, N. Y.

Scott, Albert B., Ph.D., Medicinals, Pharmaceutical Industry. Manager, Chemical Control Division, Norwich Pharmacal Co., Norwich, N. Y.

Shorr, Harold M., M.D., Medicine, Diseases of Metabolism. Instructor in Medicine, New York University, New York, N. Y.

Silver, Betty M., B.A., Enzyme Chemistry. Chemist, Department of Therapeutics, New York University, N. Y.

Singleton, W. Ralph, M.D., Genetics & Cytology. Senior Scientist, Brookhaven National Laboratory, Upton, L. I., N. Y.

Smith, Austin, M.D., Therapeutics, Administration. Director, Div. of Therapy, American Medical Association, Chicago, Ill.

Smith, Paul K., Ph.D., Medical Sciences. Research Associate, National Research Council, Washington, D. C.

Spingarn, Clifford L., M.D., Microbiology, Pharmacology. Adjunct Physician, Fellow in Bacteriology, Mt. Sinai Hospital, New York, N. Y.

Spoor, Herbert J., M.D., Ph.D., Medical Research Direction. Assistant Director, Medical Division, Bristol-Myers Co., New York, N. Y.

Stanley, Alfred R., Ph.D., Microbiology. Microbiologist, Commercial Solvents Corp., Terre Haute, Ind.

Steck, Edgar A., Ph.D., Chemistry of Nitrogen Heterocycles. Senior Research Chemist, Sterling-Winthrop Research Institute, Rensselaer, N. Y.

Stein, Harold J., M.D., Medicine, Nutritional Biochemistry. Assistant Resident Physician, Peter Bent Brigham Hospital, Boston, Mass.

Sullivan, Royal A., Ph.D., Protein Chemistry. Research Chemist, National Dairy Research Laboratories, Inc., Oakdale, N. Y.

Swiller, Samuel L., M.D., Internal Medicine. Assistant Visiting Physician, Coney Island Hospital, Brooklyn, N Y.

Swope, Robert E., D.V.M., Brucellosis. Associate Professor, Brucellosis Research, University of Maryland, College Park, Md.

Talesnik, Jaime, M.D., Physiology. Assistant Professor Physiology, University of Chile, Santiago, Chile.

Tannenbaum, Hermina S., B.A., Medical Chemistry. Laboratory Supervisor, Veterans Administration, Lyons, N. J.

Thomas, Samuel O., Ph.D., Mycology and Plant Pathology. Research Mycologist, Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.

Thompson, Helen, Ph.D., Infant Behavior. Private Practice, New York, N. Y.

Thorner, Marvin E., B.C.E., Food & Petroleum Chemistry. Editor, Science Press Association; Director of Engineering Research, U. & J. Lenson Corporation, Brooklyn, N. Y.

Thorp, W. T. S., D.V.M., Comparative Pathology. Veterinary Pathologist, National Institute of Health, Bethesda, Md.

Trikojus, Victor M., Ph.D., Biochemistry and Nutrition. Professor of Biochemistry, University of Melbourne, Melbourne, Australia.

Turner, John M., Ph.D., Biology. Research Assistant, Department of Applied Physiology, Yale University, New Haven, Conn.

Uzman, L. Lahut, M.D., Neurology. Research Fellow in Medicine, American College of Physicians, Waverly, Mass.

Vander Brook, Milton J., Ph.D., Pharmacology. Research Pharmacologist, The Upjohn Company, Kalamazoo, Mich.

Vander Meer, Ray, M.D., Medicine, Cardiology. Private practice, New York, N. Y.

Van Deventer, William C., M.D., Medicine. Medical Director, Hassler Health Home, Redwood City, Cal.

Van Harreveld, Anthonie, M.D., Ph.D., Nerve & Muscle; Physiology. Professor of Physiology, California Institute of Technology, Pasadena, Cal.

Vanselow, Waldemar, Ph.D., Photographic Theory. Research Chemist, Rochester, N. Y.

Venning, Eleanor H., Ph.D., Endocrinology. Assistant Professor in Medicine, McGill University, Montreal, Canada.

Vesell, Harry, M.D., Internal Medicine & Cardiology. Attending Physician, Beth Israel Hospital, New York, N. Y.

Waas, Frederick J., M.D., Cancer Research. Head Department of Surgery, St. Vincent's Hospital, Jacksonville, Fla.

Wachtel, Henry K., M.D., Biology. Associate Professor of Physiology, Fordham University, New York, N. Y.

Wagner, Carroll E., Cellular Physiology, Biophysics. Research Fellow, California Institute of Technology, Pasadena, Cal.

Walker, Joe E., M.D., Cardiology, Internal Medicine, Private Practice, Long Beach, Cal.

Walker, Matthew, M.D., General Surgery. Professor of Surgery, Meharry Medical College, Nashville, Tenn.

Wallenberg, Marianne, M.D., Psychiatry, Neurology, Psychoanalysis. Clinical Director, Manteno State Hospital, Manteno, Ill.

Walsh, Michael P., Ph.D., Cytology. Chairman of

Biology Dept., Boston College, Chestnut Hill, Mass.

Walton, Seth T., D.V.M., Ph.D., Bacteriology, Immunology. Principal Bacteriologist, Veterans Adm. Hospital, Oteen, N. C.

Walzer, Matthew, M.D., Allergy. Allergist, Jewish Hospital of Brooklyn, Brooklyn, N. Y.

Warburton, Fred W., Ph.D., Magnetism, reciprocal electromagnetic theory. Professor of Physics, University of Redlands, Redlands, Cal.

Warner, Ethel B., B.A., Reading Specialist. Instructor, Rutgers University, New York, N. Y.

Waterman, A an T., Ph.D., Electricity. Deputy Chief and Chief Scientist, Office of Naval Research, Navy Department, Washington, D. C.

Weber, F. C., M.D., Food Chemistry. Research Chemist, Scarsdale, N. Y.

Weil, Arthur, M.D., Biology. Retired, New York, N. Y.

Weindling, Richard, Ph.D., Plant Pathology. Microbiologist, Lederle Labs. Div., Amer. Cyanamid Co., Pearl River, N. Y.

Weinkauff, Oliver J., Ph.D., Organic Synthesis. Associate Director of Research, Monsanto Chemical Co., St. Louis, Mo.

Weiss, Abram, M.D., F.A.C.S., Psychology. Surgeon, Jersey City Medical Center, Jersey City, N. J.

Weiss, Joseph, Ph.D., Reaction Mechanism. Reader in Chemistry. University of Durham, Newcastle upon Tyne, England.

Wenrich, D. H., Ph.D., Protozoology. Professor of Zoology, University of Pennsylvania, Philadelphia, Pa.

Wertman, Hazel E., M.A., Psychology. Clinical Psychologist, Bureau of Child Guidance, New York City Board of Education, New York, N. Y.

Wertz, Anne W., Ph.D., Nutrition, Biological Chemistry. Research Professor, University of Massachusetts, Amherst, Mass.

West, Byron L., Ph.D., Organic Chemistry. Research Associate, American Cyanamid Company, Bound Brook, N. J.

Wick, Homer, C. Jr., M.D., Public Health. Candidate for M.P.H., Harvard School of Public Health, Washington, D. C.

Wiener, Irene P., B.A., Anthropology. Graduate Student.

Wiggam, Albert E., D.Sc., Psychology. National Newspaper Service, Editorial Director, Chicago, Ill.

Wilkerson, Vernon A., M.D., Biochemistry. Private Practice, Washington, D. C.

Wilner, Louis, B.S.S., Psychology, Anthropology. Sales Manager, Baltimore, Md.

Wilson, Alexander L., Ph.D., Organic Nitrogen Chemistry. Assistant Director of Research, Corn Products Refining Co., Argo, Ill.

Witschi, Emil, Ph.D., Embryology. Visiting Professor, University of Tubingen, Tubingen, Germany.

Womack, Madelyn, Ph.D., Biochemistry. Biochemist, U. S. Dept. of Agriculture, Washington, D. C.

Wood, Harland G., Ph.D., Intermediary Metabolism. Professor of Biochemistry, Western Reserve University, Cleveland, O.

Woolley, George W., Ph.D., Genetics, Cancer, Endocrinology. Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me.

Wuerthele-Caspe, Virginia, M.D., Medicine, Biology, Bacteriology. Private Practice, Newark, N. J.

Wyatt, Walter, J., Ph.D., Physical Chemistry. Chemist, U. S. Government, Washington, D. C.

Zadek, Mildred A., M.A., Psychology. Clinical Psychologist, Kings County Hospital, Brooklyn, N. Y.

Zarrow, M. K., Ph.D., Biology, Endocrinology. Research Assistant and Instructor, Department of Pharmacology, Yale University School of Medicine, New Haven, Conn.

Zawadzki, Bohdan, Ph.D., Psychology. Assistant Professor of Psychology, College of the City of New York, New York, N.Y.

Ziegler, Paul F., M.S., Surgical Dressings. Director of Research, Bauer & Black, Chicago, Ill.

Zukerman, Wolf, M.D., Human Parasitology. Associate in Medicine, Beth Israel Hospital, New York, N. Y.

STUDENT MEMBERSHIP

Bichler, David L., B.A., Biology. Graduate Student, New York University, New York, N. Y.

Cohen, Harold P., Biochemistry. Student, College of the City of New York, New York, N. Y.

Corliss, John O., B.S., Protozoology. Graduate Assistant, New York University, New York, N. Y.

Klein, Abraham, B.S.S., Psychology. Student, New School of Social Research, New York, N. Y.

Weinstein, Marvin J., B.A., Biology. Biological Technician, L.I. University, Brooklyn, N. Y.

B. Elected October 28, 1947

SUSTAINING MEMBERSHIP

Friedman, William H., M.A., Technical Education. President, Carey Press Corporation, New York, N. Y.

Gross, Samuel, Ph.Ch., Pharmacy, Medicine. Pharmacist, New York, N. Y.

Reiss, Isidor, General. Partner, Friedman & Reiss, New York, N. Y.

van Dorsser, Gerard J. E., B.S.A., Biology. Technical Consultant, Ingram & Bell, Ltd., Toronto, Canada.

ACTIVE MEMBERSHIP

Andrew, Warren, M.D., Cellular Changes with Age. Professor of Anatomy, George Washington University, Washington, D. C.

Baylek, Thomas W., M.D., Anthropology. Associate Surgeon City Hospital, New York, N. Y.

Berger, Frank M., M.D., Experimental Medicine. Assistant Professor of Pediatrics, University of Rochester, Rocheste, N.Y.

Bird, Junius B., American Archaeology. Associate Curator of Anthropology, American Museum of Natural History, New York, N. Y.

Birnkrant, William B., M.D., Internal Medicine. Visiting Physician, Gouverneur Hospital, New York, N. Y.

Bogusky, John, M.S., Biology, Physics, Chemistry. Bacteriologist, PMA, Insecticide Division, Beltsville, Md.

Borgen, Daniel R., M.S., Biochemistry. Chemist, Baxter Laboratories, Inc., Morton Grove, Ill.

Bouthilet, Robert J., Ph.D., Chemistry, Microbiology. Instructor, University of California, College of Agriculture, Berkeley, Cal.

Chandler, Caroline A., M.D., Antibiotics. Assistant Professor of Preventive Medicine, Johns Hopkins University School of Medicine, Baltimore, Md.

Chin, Tom Doon-Yuen, M.D., Tropical Diseases. Resident Physician, Sea View Hospital, Staten Island, N. Y.

Coakley, John D., Ph.D., Psychology. Vice President, Dunlap, Morris & Associates, New York, N. Y.

Cohen, Aaron, M.D., Physics, Biology, Chemistry. Associate Attending Physician, Maimonides Hospital, Brooklyn, N. Y.

Cohen, Lester, M.D., Internal Medicine, Psychoanalysis. Director of Internal Medicine, Hillside Hospital, Queens, N. Y.

Cruse, Andrew W., B.S., Physics, Radio, Acoustics. Asst. Vice Pres., International Tel. & Tel. Corp., New York, N. Y.

Day, Mariel, B.S., Bacteriology, Antibiotics. Bacteriologist, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.

Deane, Norman, M.D., Internal Medicine. Resident Physician, Medical Center, Jersey City, N. J.

Dorfman, Wilfred, M.D., Biology, Psychology, Chemistry. Asst. Visiting Physician, Coney Island Hospital, Brooklyn, N. Y.

Dumas, Peter A., M.D., Medicine, Chemistry. Intern, Episcopal Hospital, Philadelphia, Pa.

Dumke, Paul R., M.D., Physiology, Pharmacolgy. Asst. Professor of Surgery, University of Pennsylvania Medical School, Philadelphia, Pa.

Dyckman, Jacob, M.D., Pathology. Resident Physician, Mt. Sinai Hospital, New York, N. Y.

Fishman, Sidney, Ph.D., Psychology. Research Associate, College of Engineering, New York University, New York, N. Y.

Flamm, Gerald H., M.D., Internal Medicine. Private practice of Medicine, Brooklyn, N. Y.

Fletcher, Robert D., D.Sc., Meteorology. Chief, Hydrometeorological Section, U. S. Weather Bureau, Washington, D. C.

Forman, Carolyn, M.D., Biology. Resident in Pediatrics, Childrens Hospital, Philadelphia, Pa.

Fountain, John, A.B., Physics, Ethnology, Anthropology. Statistician, White, Weld & Company, New York, N. Y.

Franks, Andrew G., M.D., Dermatology. Private Practice, New York, N. Y.

Grant, Gordon A., Ph.D., Hormones, Antibiotics, Chemotherapy. Director of Research, Ayerst, McKenna & Harrison, Ltd., Montreal, Canada.

Hall, Byron E., Ph.D., Internal Medicine. Associate Professor of Medicine, Mayo Foundation, Rochester, Minn.

Hanlon, Lawrence W., M.D., Internal Medicine. Asst. Professor of Anatomy, Cornell University, New York, N. Y.

Hazen, Elizabeth L., Ph.D., Bacteriology, Mycology. Bacteriologist, New York State Department of Health, New York, N. Y.

Hess, Manfred, M.D., Biology, Medicine. Physician, Private practice, New York, N. Y.

Hodgson, Edward S., Jr., B.A., Embryology. Junior Instructor, Johns Hopkins University, Baltimore, Md.

Horner, David B., M.D., Biology, Medicine. Department of Medicine & Surgery, Veterans Administration, New York, N. Y.

Howes, Edward Lee, M.D., Medicine, Biology. Associate Clinical Professor of Surgery, Columbia University, New York, N. Y.

Kane, Norma Jane, M.S., Synthetic Organic Chemistry. Technical Editor, New York, N. Y.

King, Barry G., Ph.D., Physiology. Chief, Aeromedical Design & Material Division, Medical Service, Civil Aeronautics Administration, Washington, D. C.

Kossman, Charles E., Sc.D., Cardiovascular Diseases. Assistant Professor of Medicine, New York University College of Medicine, New York, N. Y.

Lederman, Frederick W., M.D., Tuberculosis. Private practice, New York, N. Y.

Lewis, Thomas H., M.D., Medicine, Zoology, Biology. Medical Office, Navy Unit, WSPG, Las Cruces, N. M.

McCallion, David, M.A., Amphibian Regeneration. Teaching Fellow in Biology, Brown University, Providence, R. I.

McCoy, John R., V.M.D., Veterinary Medicine. Veterinarian, Raritan Animal Hospital, Stelton, N. J.

Moran, Clifford F., M.D., Pathology. Instructor in Pathology, New York Medical College, New York, N. Y.

Murphy, Edward A., B.A., Biochemistry. Assistant in Nutritional Research, University of California, Los Angeles, Cal.

Nielsen, A. M., Sc.D., Geography. Associate Professor of Economic Geography, New York University, New York, N. Y.

Noble, Jerome, M.D., Internal Medicine. Resident Intern, Halloran V. A. Hospital, Staten Island, N. Y.

Orrico, Alphonso J., Sc.D., Psychology. Psychoclinician, Private Practice, Jersey City, N. J.

Ottenheimer, Julius G., M.D., Cardio Vascular diseases. Adjunct Cardiologist, Beth David Hospital, New York, N. Y.

Passalacqua, Luis A., M.D., Surgery. Chief, Surgical Service, V. A. San Patricio Hospital, Santurce, P. R.

Pierson, Willard J., Jr., B.S., Meteorology. Graduate Student, New York University, New York, N. Y.

Ralph, Robert D., M.D., Biology, Psychology, Physics, Chemistry. Otolaryngologist, ERP Health Association, Washington, D.C.

Reichard, John Davis, M.D., Psychology, Biology. Special Consultant, U. S. Public Health Service, Staten Island, N. Y.

Reifenstein, Edward C., Jr., M.D., Endocrinology, Metabolism, Cancer. Clinical Endocrinologist, Sloan-KetteringInstitute, New York, N. Y.

Restuccia, Marie, B.S., Physiological Chemistry. Research Assistant, Department of Surgery, New York University, New York, N. Y.

Rosenbaum, Arthur B., M.D., Biology, Psychology, Physics, Chemistry. Internal Medicine, Group Health Association, Washington, D. C.

Schuh, Joseph E., M.S., Cytology. Graduate Student, Columbia University, New York, N. Y.

Schwartz, Irving L., M.D., Physiology. Fellow, Department of Physiology, New York University, College of Medicine, New York, N. Y.

Selikoff, Irving J., M.D., Internal Medicine, Bio-

chemistry. Asst. Attending Physician, Sea View Hospital, Staten Island, N. Y.

Stein, Frances E., M.D., Biology. Asst. Surgeon, Harlem Hospital, New York, N. Y.

Stern, Charles M., Jr., Animal Biology & Anthropology. Medical Illustrator, New York Post Graduate Hospital, New York, N.Y.

Stetten, Marjorie R., Ph.D., Biochemistry. Associate, Division of Nutrition & Physiology, Public Health Research Institute of the City of New York, New York, N. Y.

Tanyolac, Necmi, E. E., Electrical Engineering and Odor. Gruaduate Student, Purdue University, Lafayette, Ind.

Tate, John T., D.Sc., Physics. Research Professor of Physics, University of Minnesota, Minneapolis, Minn.

Taylor, Fletcher B., M.D., Medicine. Various hospital staff appointments, Oakland, Cal.

Terplan, Kornel L., M.D., Pathology. Professor of Pathology and Bacteriology, University of Buffalo, Buffalo, N. Y.

Thomas, Roy C., M.A., Bacteriology. Associate Plant Pathologist, Ohio Agricultural Experiment Station, Wooster, O.

Tobin, John A., Jr., Ph.D., Physics. Professor of Physics, Boston College, Boston, Mass.

Topper, Yale J., Ph.D., Biochemistry. Associate, Public Health Research Institute of the City of New York, New York, N. Y.

Trapido, Harold, Ph.D., Biology. Biologist, Gorgas Memorial Laboratory, Panama, R. P.

Veatch, Jeannette, M.A., Cultural Anthropology. Instructor, Elementary Education, New York University, New York, N. Y.

Weiss, Leon P., M.D., Medicine. Intern, Maimonides Hospital, Brooklyn, N. Y.

Williams, Clyde, D.Sc., Administrative Research. Director of Research, Battelle Memorial Institute, Columbus, Ohio.

STUDENT MEMBERSHIP

Dinegar, Robert H., A.M., Physical Chemistry. Research Student, Columbia University, New York, N. Y.

Hafter, Ethel, B.A., Biology. Technician, Biology Department, New York University New York, N. Y.

Jacobson, Gerald H., B.S., Chemistry. Technician, Brooklyn College, Brooklyn, N. Y.

Knobloch, Herbert J., Zoology. Associate in Charge, Department of Education, New York Zoological Park, Bronx, N. Y.

Pincus, Howard J., M.A., Geology. Graduate Assistant, Department of Geology, Columbia University, New York, N. Y.

Editor's Newsnotes

Sir Henry Hallett Dale, O.M., was elected president of the Royal Society of Medicine on July 6—the first time this honor has been bestowed on other than a practising physician, surgeon or specialist. Sir Henry, a research scientist, won the Nobel Prize for Medicine in 1936. He was President of the Royal Society, London, from 1940 to 1945 and last year was elected to Honorary Life Membership in the Academy.

Illustrated London News

Doctor Athelstan F. Spilhaus, of New York University, has been appointed dean of the Institute of Technology at the University of Minnesota. Doctor Spilhaus, formerly Chairman of the Section of Oceanography and Meteorology, served as Corresponding Secretary during the current year, and when he takes up his new duties early next year the Academy will lose one of its most active Councilors.

—News Release